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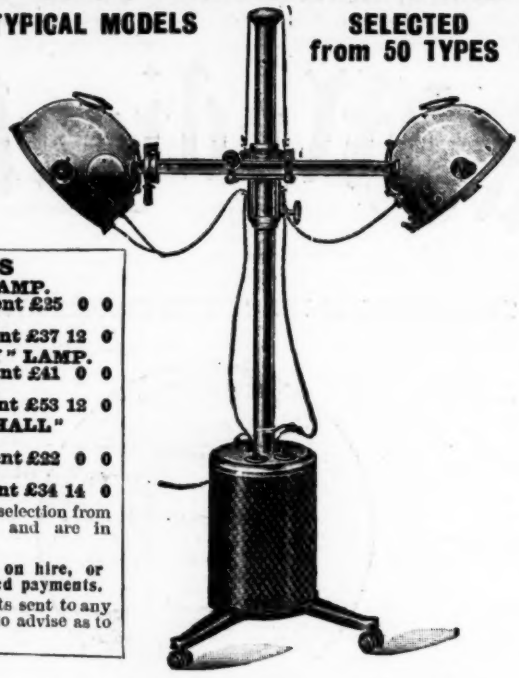

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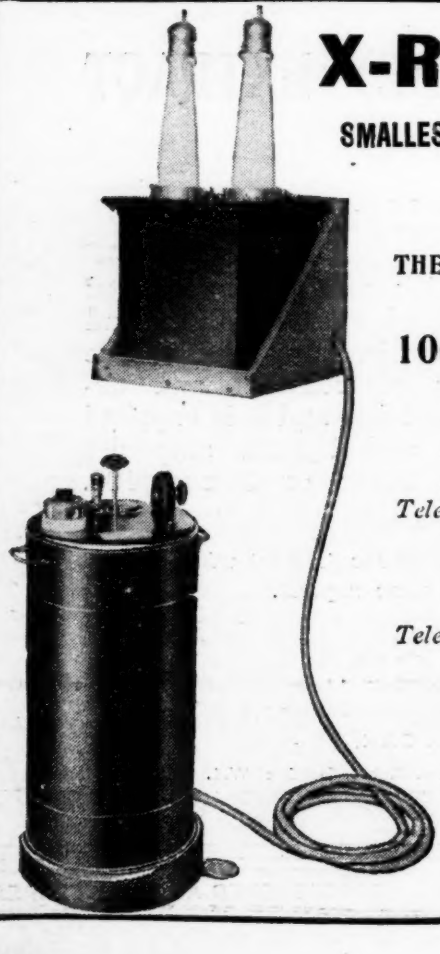

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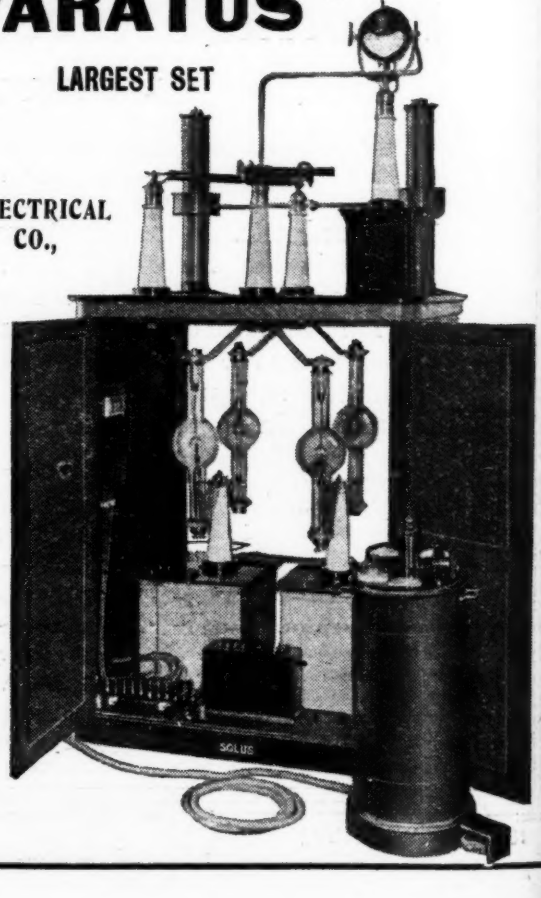

The Harveian Oration
ON
GILBERT, BACON, AND HARVEY.

Delivered before the Royal College of Physicians of London, October 18th, 1927,
BY
Sir WILLIAM HALE-WHITE, K.B.E., M.D.Lond., M.D.Dub., LL.D.Ed.,
consulting physician to guy's hospital.

There are two reasons why Harvey should be placed in the select class of really great men. One is, because he discovered that the blood circulates, being compelled to do so by the contraction of the heart; the other—even more powerful—is, because he was among the earlier scientists to show the value of properly conducted experiment.

Every man's mind is compounded of what is born within him, modified by impressions received from without. Therefore it is of interest to see who were the men around Harvey who might have influenced him. At Padua there were his teachers; many Harveian Orators have dealt with this part of his life, but I propose to see if any of his own countrymen, perhaps without his knowledge, can have helped to mould such of his thoughts as led to his great discovery. I shall make many quotations, but this, I trust, you will pardon—first, because, in any argument, it is necessary that the premisses should be precise; secondly, because the language of Bacon is like music to the ear.

Inasmuch as Harvey and Francis Bacon—commonly called Lord Bacon, which is wrong (his titles were Baron Verulam of Verulam and Viscount St. Alban)—were contemporaries, we must consider whether it is likely that he swayed Harvey.

"*The Advancement of Learning.*"

Harvey published his discovery in 1628, and tells us that he had, for nine years and more, in his lectures, confirmed "these views by multiplied demonstrations in your presence, illustrated them by arguments and freed them from the objections of the most learned and skilful anatomists." His first mention of it is in his notebook dated 1616. *The Twoo Bookes of Francis Bacon of the Proficience and Advancement of Learning Divine and Humane*, were first published in 1605, when Harvey was 27 years old, twenty-three years before the publication of his discovery and several years before he made it. *The Advancement of Learning*, "the first great book in English prose of secular interest" (Church), had many readers, for three editions quickly appeared. When his *Instauratio* was issued Bacon sent the King a copy, with a letter saying he thinks it will find many readers "because I hear my former book of the *Advancement of Learning* is well tasted in the Universities here, and the English Colleges abroad; and this is the same argument sunk deeper."[1] The *Advancement*, which we thus see was widely read in the years immediately following its publication, implores those who wish to delve into the secrets of nature to discountenance mere authority and not blindly to believe what they are told, but to seek knowledge for themselves by observation and experiment; it teaches how properly to use induction; it points out the hopelessness of the false methods of reasoning commonly used; it has much in it about medicine. It is a noble work, devoted to the lofty purpose of increasing knowledge; its language is so beautiful and dignified that it may be placed second to that of Shakespeare.

The first book contains an oblation to James I, because Bacon longed to persuade the King to be interested in learning. In this he failed, as he had with Elizabeth.

Passing to the second book I will, by direct quotation,* try to prove that the *Advancement of Learning*, so immediately popular that Harvey must have known of it, would have appealed to him. Much of the argument is directed to show that a reform of method in the pursuit of knowledge is necessary. Thus:

"For as things are now, if an untruth in nature be once on foot, what by reason of the neglect of examination and countenance of antiquity, and what by reason of the use of the opinion in similitudes and ornaments of speech, it is never called down." (Vol. 3, p. 331.)

"For the handling of final causes mixed with the rest in physical enquiries, hath intercepted the severe and diligent inquiry of all real and physical causes . . . to the great arrest and prejudice of further discovery . . . and have brought this to pass that the search for Physical Causes hath been neglected and passed in silence." (Vol. 3, pp. 357, 358.)

"It being the nature of the mind of man (to the extreme prejudice of knowledge) to delight in the spacious liberty of generalities and not in the enclosures of particularity." (Vol. 3, p. 359.)

"Where there is much controversy there is at many times little enquiry." (Vol. 3, p. 403.)

"They hastened to their theories and dogmaticals and were imperious and scornful towards particulars." (Vol. 3, p. 387.)

Next listen to a few quotations illustrating Bacon's plea for the experimental method.

"I find some collections made . . . but commonly with a rejection of experiments familiar and vulgar. For it is esteemed a kind of dishonour unto learning to descend to inquiry upon matters mechanical" [or as we should say nowadays, experimental]. (Vol. 3, p. 332.)

"All true and fruitful Natural Philosophy hath a double scale or ladder, ascendent and descendent; ascending from experiments to the invention of causes and descending from causes to the invention of new experiments." (Vol. 3, pp. 351, 352.)

"Those experiments be not esteemed which have an immediate and present use, but those principally which are of most universal consequence for invention of other experiments" (Vol. 3, p. 363), "the use of History Mechanical" [that is, experimental] "is of all others the most radical and fundamental towards natural philosophy." (Vol. 3, p. 332.)

Then there is a fine passage emphasizing the value of experiment, too long to quote in full; it begins:

"But here was their chief error; they charged the deceit upon the senses: which in my judgement are very sufficient to certify and report truth, though not always immediately, yet by comparison, by the help of instrument." (Vol. 3, pp. 338, 339.)

Nowadays it is recognized that those who spend their lives investigating nature should be paid. Bacon anticipated us, saying:

"There will hardly be any main proficience in the disclosing of Nature, except there be some allowance for expenses about experiments . . . and therefore as secretaries and spials of princes and states bring in bills for intelligence, so you must allow the spials and intelligencers of Nature to bring in their bills, or else you shall be ill advertised." (Vol. 3, p. 325.)

The *Advancement* tells us that medicine "is a most noble art," its object being "to tune this curious harp of man's body and reduce it to harmony." The author pities the physician, for he is judged by the event, "which is ever but as it is taken; for who can tell if a patient die or recover . . . whether it be art or accident? And therefore many times the impostor is prized and the man of virtue taxed. Nay we see the weakness and credulity of man is such, as they will often prefer a mountebank or witch before a learned physician." (Vol. 3, p. 371.) Consequently physicians say to themselves, "If it befall to me as befalleth to the fools, why should I labour to be more wise?" (Vol. 3, p. 372.)

Bacon criticizes the doctors of the day quite fairly; he finds that comparative anatomy, physiology, and morbid anatomy are not studied as they should be; that no use is made of vivisection, and that if "a man look into their prescripts and ministrations . . . he shall find them but inconstancies and every day devices without any settled providence or project." (Vol. 3, p. 377.) His attitude to medicine is shown in the sentence, "There is one thing still remaining which is of more consequence than all the rest:—namely, a true and active Natural Philosophy for the science of Medicine to be built upon" (Vol. 4, p. 390); and his attitude to science may be summed up in two sentences: "And this is the very thing which I am preparing and labouring at with all my might,—to make

* All quotations, unless otherwise indicated, are from *The Works of Francis Bacon*, collected and edited by Spedding, Ellis, and Heath (fourteen volumes; London, 1901); reference to volume and page is given at the end of these quotations.

the mind of man by help of art, a match for the nature of things . . . when he uses some direction and order in experimenting, it is as if he were led by the hand." (Vol. 4, pp. 412, 413.)

Surely, after these extracts, we must believe that Bacon's own physician, Harvey, was influenced by his patient's book, which was widely known, was published some years before Harvey began his researches, contains much about medicine, and preaches reform of method and the use of experiment, in both of which Harvey's strength lay. I do not like to think that he was so ill educated as not to have followed other learned people in reading the *Advancement* by the author of the already popular *Essays*, for Bacon's contemporary, Ben Jonson, in a review of the great English writers, says of him: "he who hath filled up all numbers, and performed that, in our tongue may be compared or preferred either to insolent Greece or to haughty Rome,"[2] and in these days we have Abbott speaking of Bacon's unique mastery of the English language. If we remember that these words are said of a man writing at the time of Shakespeare and the Authorized Version, then we get a measure of Bacon's greatness as a writer.

Another work of Bacon's that must have been known to Harvey before he made his discovery is *De Sapientia Veterum*, issued in 1609; it was much appreciated, and was soon reprinted and translated. Its general trend is welcome to a man well disposed towards experiment, for the proper investigation of Nature is recommended in it.

The "Novum Organum."

In 1620 a book was published which began thus: "*The Great Instauration. Pro-oemium.* Francis of Verulam reasoned thus with himself and judged it to be for the interest of the present and future generations that they should be made acquainted with his thoughts." (Vol. 4, p. 7.) He tells us that the human intellect makes its own difficulties and hence ignorance and mischiefs innumerable. Therefore the author is "to commence a total reconstruction of sciences, arts and all human knowledge." (Vol. 4, p. 8.) Lest he should die before the work is finished, it was to be published in six parts. The first, which appeared after the second, was *De Augmentis*. The second, issued in 1620, was the *Novum Organum*, not quite completed. Only fragments of some of the other parts were ever written; Bacon calculated that his work when finished would be sixfold as voluminous as Pliny. If this estimate is correct we only have one-twentieth of the whole.

The *Novum Organum* has all the beauties of the *Advancement*; it is a masterpiece of condensed writing, without a word too many and each word precisely right. As with the *Advancement*, I will give extracts which will show that it also is just such a book as would help to form a mind like Harvey's. In the "Plan" introducing us to the *Novum Organum* we find this:

> "The subtlety of experiments is far greater than that of the sense itself. I contrive that the office of the sense shall be only to judge of the experiment and that the experiment shall judge of the thing." (Vol. 4, p. 26.)
>
> "Those however who aspire not to guess and divine, but to discover and know; who propose not to devise and mimic fabulous worlds of their own, but to examine and dissect the nature of this very world itself; must go to facts themselves for everything." (Vol. 4, p. 28.)

In the preface is this eloquent exhortation:

> "But if any man there be who . . . aspires to penetrate further; to overcome, not an adversary in argument but nature in action; to seek, not petty and probable conjectures, but certain and demonstrable knowledge with me, that passing by the outer courts of nature which numbers have trodden, we may find a way at length into her inner chambers." (Vol. 4, p. 42.)

In the *Novum Organum* itself we are warned not to pin our faith to the syllogism, for the premisses being only words often there is no firmness in the superstructure—our only hope lies in a true induction; we are reminded that we can only progress by the study of particulars. We are told that "it is the peculiar and perpetual error of the human intellect to be more moved and excited by affirmatives than negatives; whereas it ought properly to hold itself indifferently disposed towards both alike." (Vol. 4, p. 56.) "What a man had rather were true he more readily believes." (Vol. 4, p. 57.) We suffer from "the mischievous authorities of systems, which are founded either on common notions or on a few experiments or on superstition." (Vol. 4, p. 66.) Then follows advice to physicians to renounce all varieties of false reasoning, for "the entrance into the kingdom of man, founded on the sciences, being not much other than the entrance into the kingdom of heaven, whereunto none may enter except as a little child." (Vol. 4, p. 69.) "The manner of making experiments which men now use is blind and stupid." (Vol. 4, p. 70.) "Men are inclined to turn aside from their experiments for some practical application of them, like Atalanta, they go aside to pick up the golden apple and let victory escape them, they should seek for experiments of light, not for experiments of fruit." (Vol. 4, p. 71.)

A few pages further on we find this beautiful passage:

> "And an astonishing thing it is to one who rightly considers the matter, that no mortal should have seriously applied himself to the opening and laying out of a road for the human understanding direct from the sense, by a course of experiment orderly conducted and well built up; but that all has been left either to the mist of tradition, or the whirl and eddy of argument, or the fluctuations and mazes of chance and of vague and ill digested experience." (Vol. 4, p. 80.)
>
> "No one has yet been found so firm of mind and purpose as resolutely to compel himself to sweep away all theories and common notions and to apply the understanding thus made fair and even, to a fresh examination of particulars." (Vol. 4, p. 93.)
>
> "A greater abundance of experiments is to be sought for and procured." (Vol. 4, p. 95.)

Then to magnify the dignity of investigation Bacon quotes the proverb of Solomon, "The glory of God is to conceal a thing; the glory of the king is to search it out." (Prov. xxv, 2.)

Bound up with the first edition of the *Novum Organum* Bacon published a *Description of a Natural and Experimental History such as may serve for the foundation of a True Philosophy*. The introduction contains some of his most magnificent writing. Read this:

> "Meanwhile what I have often said I must here emphatically repeat; that if all the wits of all the ages had met or shall hereafter meet together; if the whole human race had applied or shall hereafter apply themselves to Philosophy, and the whole earth had been or shall be nothing but academies and colleges and schools of learned men; still without a natural and experimental history such as I am going to prescribe, no progress worthy of the human race could have been made or can be made in philosophy and the sciences. Whereas, on the other hand, let such a history be once provided and well set forth, and let there be added to it such auxiliary and light giving experiments as in the very course of interpretation will present themselves. . . . For in this way, and in this way only, can the foundations of a true and active philosophy be established; and then will men wake as from a deep sleep, and at once perceive what a difference there is between the dogmas and figments of the wit and a true and active philosophy, and what it is in questions of nature to consult nature herself." (Vol. 4, p. 252.)

One more quotation from the same source I cannot resist: "Away with antiquities and citations or testimonies of authors." (Vol. 4, p. 254.)

Was Harvey indebted to the "Novum Organum"?

But, some may say, all this is beside the mark, for, before this book appeared in 1620, Harvey, for about four years, had been teaching that the blood circulates. Thus in a leading article in the British Medical Journal we find "a comparison of dates shows that Harvey could not owe anything to the *Novum Organum*."[3] On the face of it this appears a fair inference, but it is probably incorrect because of the following considerations. The most trustworthy account we have of Bacon is that by his chaplain Rawley, who says:

> "His book of the *Instauratio Magna* . . . was the production of many years' labour and travel. I myself have seen at least twelve copies of the *Instauration* revised year by year one after another, and every year altered and amended in the frame thereof, till at last it came to that model in which it was committed to the press . . . he would often ask if the meaning was expressed plainly enough."

Further, many tracts, which are trials for the great book, were found among Bacon's papers after his death. Some were written as early as 1603-1605. I need not name

them as they can all be found in *The Works of Francis Bacon*. A quotation from the *Cogitationes* will suffice:

"And it were shame that men should have examined so carefully the tinklings of their own voice and should yet be so ignorant of the voice of nature." (Vol. 5, p. 426.)

We see, therefore, that for many years before the publication of the *Novum Organum*, and before Harvey began his experiments, Bacon's mind was much occupied with it, and that he worked hard at it, making numerous trials; he certainly talked about it with his chaplain, consequently it is likely that he talked about it with his physician, of whom, as we shall see presently, he probably saw much, for there was no secret about Bacon's philosophical work; he invited criticism from several friends; many had already read the *Advancement* published earlier; he often spoke of his desire to study, and it was well known how he busied himself in his leisure. We can hardly err if we conclude that not only the thoughts expressed in the *Advancement*, which we have seen Harvey had ample opportunity of reading before he began his experiments, but also those which simmered in Bacon's brain between the publication of this work and that of the *Novum Organum*, in which they were embodied, were known to and affected Harvey, to whom they would have been particularly congenial, for he became one of the greatest of discoverers because he experimented and disregarded mere authority.

Effect on Science of Bacon's Teaching.

If I have carried my readers with me so far, they are with me in thinking that Bacon's teaching touched the mind of Harvey; yet it will be an advantage to see if this opinion is strengthened by what others have thought of the position of Bacon's writings in the history of science. Aristotle and Leonardo da Vinci had experimented, and several others, such as Albert the Great, Vanini, Campanella, and Ramon Lull, as may be seen in Professor Peers's recent translation of Blanquerna,[4] saw that mere authority was allowed to override reason. Roger Bacon had laid down precepts that might have guided men aright, but so abstract and dogmatic was the ordinary teaching up to the time of Francis Bacon that these examples bore little fruit, being stifled under the mass of theological, metaphysical, and commentatorial literature with which the Middle Ages abounded. It was Francis Bacon who caused this deadening fog, which bemused all originality, to roll back when he directed men to discard authority and to seek out nature by proper observation, proper reasoning, and proper experiment. People of his own time saw this. Rawley says, "if there was a beam of knowledge derived from God upon any man in these modern times, it was upon him." Peter Heylin, who was a young man when the *Great Instauration* was first published, tells us:

"The Lord Chancellor Bacon was a man of most strong Brain and a chymical Head. . . . Pity it was, he was not entertained with some liberal salary, abstracted from all Affairs both of Court and Judicature, and furnished with sufficiency both of Means and Helps for the going on of his Design. Which had it been, he might have given us such a body of Natural Philosophy, and made it so subservient to the public good, that neither Aristotle, nor Theophrastus amongst the ancients, nor Paracelsus or the rest of our latter chymists would have been considerable."[5]

Sprat writes:

"I shall only mention one Great Man who had the true Imagination of the whole extent of this Enterprise, as it is now set on foot; and that is, the Lord Bacon. . . . His Genius was searching and inimitable."[6]

The enterprise was the foundation of the Royal Society, and it is generally allowed that it was Bacon's *New Atlantis* and the thoughts inspired in others by him which led to the foundation not only of the Royal Society but also of several foreign scientific associations. Metaphysical Cowley in his poem to this Society writes thus:

"Bacon, like Moses, led us forth at last,
The barren Wilderness he past,
Did on the very Border stand
Of the blest promis'd Land,
And, from the Mountain's top of his exalted Wit,
Saw it himself and shewed us it."[7]

So much for the past opinion of Bacon's influence. During three centuries it has remained unchanged. We find Leibnitz[8] remarking "We do well to think highly of Verulam for his hard sayings have a deep meaning in them." Whewell[9] mentions no other author in his preface, and begins his book with a quotation from Bacon, and Macaulay writes that Bacon "moved the intellects which moved the world." Space allows me to quote only two modern writers. Professor Fowler[10] tells us, "What Bacon says of Plato is pre-eminently true of himself, he was 'a man of a sublime genius who took a view of everything as from a high rock.'" He popularized and dignified experimentation and the study of nature. "It would hardly, I think, be an exaggeration to compare Bacon in the intellectual sphere with Luther in the sphere of religion." Church[11] writes that Bacon "had the brightest, richest, largest mind but one, in the age which had seen Shakespeare and his fellows." Later on he says, "in temper, in honesty, in labour, in humility, in reverence he was the most perfect example that the world had yet seen of the student of nature, the enthusiast for knowledge." In the introduction to Fowler's edition of the *Novum Organum* will be found a long list of testimonies by many writers to the extraordinary power that Bacon's teaching has had upon scientific thought and production. The chief claim that Bacon made for himself is quaintly expressed in the letter he wrote to Dr. Playfer: "I have only taken upon me to ring a bell to call other wits together (which is the meanest office), it cannot but be consonant to my desire, to have the bell heard as far as can be."[12] Truly its peal has been heard all over the world and has reverberated for three centuries, and surely these references suggest that Harvey must have heard its call.

Bacon's Personality.

Having shown that Bacon's teaching was available to Harvey, was well known while he was a young man, and would be attractive to him, let us see whether the last is true also of Bacon's personality. Nobody is more likely to know him well than his secretary, Meautys, and his chaplain, Rawley. Both were devoted to him, and the first says his sole ambition is to grow up only under his Lordship and, come what come may, to serve him with his life and fortune, laying down all he has at his feet.[13] The second shows us that Bacon must have been a delightful conversational companion.

"His meals were refections of the ear as well as of the stomach . . . wherein a man might be refreshed in his mind and understanding no less than in his body. . . . In which conversations . . . he was no dashing man, as some men are, but ever a countenancer and fosterer of another man's parts. Neither was he one that would appropriate the speech wholly to himself, or delight to outvie others, but leave a liberty to the co-assessors to take their turns."[14]

Tobie Mathew, son of the Archbishop of York, says of Bacon: "It is not his greatness I admire, but his virtue. It is not the favours I have received of him that have enthralled and enchained my heart, but his whole life and character; which are such, that, if he were of an inferior condition, I could not honour him the less, and if he were my enemy I should not the less love and endeavour to serve him."[15]

Ben Jonson tells lovingly of his virtue and thus of his speech:

"No man ever spake more neatly, more pressly, more weightily; or suffered less emptiness, less idleness, in what he uttered. . . . No man had their affections more in his power. The fear of every man that heard him was, lest he should make an end."[16]

His secretary and apothecary, Boener, hoped that a statue of him would be put up, not because of his learning, but on account of his being "a memorable example to all of virtue, kindness, peacefulness, and patience."[17]

We know a man by his friends. Bacon drew them from everywhere. There were many abroad and in this country —Essex, Buckingham, Lancelot Andrewes, Selden, Bodley, Hobbes, Jonson, Mathew, and George Herbert the poet, who helped in the translation of the *Advancement* into Latin and who wrote verses in praise of Bacon, who in his turn dedicated his versification of the Psalms to Herbert, saying he was his affectionate friend. Bacon had few enemies; the chief was Coke, his professional

antagonist. He was popular, as we learn from the fact that when he took his seat as Lord Keeper, besides the servants, the Judges, and the Inns of Court, he was accompanied by most of the nobility, with other gallants to the number of two hundred horse.

All this shows him to have been a lovable, charming person with whom everybody would enjoy talking, and it is incredible that his physician did not converse with him and that he was ignorant of his teaching.

Bacon's Health.

On the whole, Bacon's health was good; nevertheless he was a chronic dyspeptic, giving considerable thought to his symptoms and indulging abundantly in aperients. He has left us very particular accounts of how he took these and how they acted.[18]

In 1617 he had an illness thought to be gout, but it only lasted a few days. A contemporary letter[19] says, "he hath so tender a constitution both of body and mind that he will hardly be able to undergo the burden of so much business." This surmise was incorrect, for during the next four years Bacon worked very hard. Two years later he was away from work for a time, probably owing to an attack of stone, "which held him in great pain two or three days."[20] That he was very fond of taking medicine is shown by these and other references, and by a letter written in 1623, which is of interest as having to do with the separation of the "Company of Potycaries" from that of Grocers; in it he says: "You may perhaps think me partial to Potycaries, that have been ever puddering in physic all my life."[21]

Bacon depended on his physicians. When he was let out of the Tower he was not allowed to come within the verge of the Court, and thus he could not live in London. In some moods he thought the Tower preferable to such liberty, for he wrote in his petition to the House of Lords, "there I could have company, physitians," and he said the same in two letters to Buckingham, to whom, in a letter two years later, he again speaks of his physicians, whom he calls strange creatures. It is difficult to conceive a patient more likely to consult his physician frequently than one who was a chronic introspective dyspeptic, rejoiced in purgatives, had gout and a stone, especially as we have just seen that this patient was one with whom the physician would have delighted to talk, and many statements in *Sylva Sylvarum* suggest that Bacon often discoursed with doctors.

Further, apart from the relationship of patient and physician, Bacon and Harvey must have seen much of each other, for London was no bigger than a large provincial town of to-day; both moved among the Court and nobility, and both were in the small class of the well educated.

Harvey's Mind similar to Bacon's.

I have now finished what may be called the Baconian side of my argument. The Harveian side will be much shorter. The philosopher said observe and experiment properly, deduce scientifically, without attention to mere authority; no one could have done this more rigorously than the physician, whose mind was in this matter the counterpart of that of the philosopher, for Harvey said to Ent, "I have oftentimes wondered and even laughed at those who have fancied that everything had been so consummately and absolutely investigated by an Aristotle or a Galen or some other mighty name that nothing could by any possibility be added to their knowledge."[22] In the introduction to his work on the *Generation of Animals* he writes: "Without the due admonition of the senses, without frequent observation and reiterated experiment, our mind goes astray after phantoms and appearances." Further on: "The method of investigating truth commonly pursued at this time therefore is to be held erroneous and almost foolish, in which so many inquire what others have said, and omit to ask whether the things themselves be actually so or not." Or, to take a passage from the introduction to *De Motu*: "It will be proper to look more narrowly into the matter; to contemplate the motion of the heart and arteries, not only in man, but in all animals that have hearts; and further, by frequent appeals to vivisection, and constant ocular inspection, to investigate and endeavour to find out truth."

Really, except that the language has not the mighty grandeur of that of Bacon, it might be he writing. So do the minds of Bacon and Harvey jump together that we are constrained to believe that the elder influenced the younger, particularly when we recollect the other reasons already given for this belief.

Value of Evidence that Harvey was not Influenced by Bacon.

The view here put forward of the relationship between them is not that held by many writers, several of whom speak of Harvey's contempt for Bacon, or state that he can owe nothing to him. Those who maintain the last have forgotten the *Advancement* and the history of the *Novum Organum*. All who profess the first base it on the following: Aubrey[23] tells us, "He [Harvey] had been physitian to the Lord Chancellor Bacon, whom he esteemed much for his witt and style, but would not allow him to be a great philosopher. 'He writes philosophy like a Lord Chancellor,' said he to me, speaking in derision; 'I have cured him.'"

Assuredly this anecdote does not justify the belief that Harvey was not affected by Bacon. Aubrey tells us that it was not until 1651 that he became acquainted with Harvey, who was then 73 years old. Aubrey's statement is probably muddled, for, as Bacon had been dead twenty-five years, Harvey most likely said "he wrote," and for the same reason should have said "I cured him," and Aubrey does not make it clear whether Bacon was cured of a bodily ailment or of writing philosophy like a Lord Chancellor. Harvey, who according to Aubrey was very cholerie and was certainly aged, was speaking of a patient dead twenty-five years before, and, being cholerie, may easily, for mere argument's sake, have taken the other side to Aubrey in not allowing Bacon to be a great philosopher; and we must also remember that, even if this were Harvey's deliberate opinion, others have thought so too, but have, nevertheless, considered that Bacon did more than anyone to point the way to the proper mode of scientific research. We only have Aubrey's statement that Harvey spoke in derision of Bacon's way of writing; but, even if he did, he can only have meant that Bacon wrote in a stately, dignified, perhaps rather pontifical way; if he meant anything else he was very foolish, for, as already shown, it was allowed when Bacon was alive, and has been ever since, that few can match his prose. Certainly there is nothing in this story to suggest that Bacon did not influence Harvey; indeed, it is the other way, for he must have read the philosopher before he could give an opinion as to how he wrote, and we are told he esteemed his wisdom and style.

But quite apart from this argument there is another reason why we should not pay any attention to this anecdote—namely, that Aubrey is quite unreliable. He did not begin his *Lives* till 1680, when he put each name in a book: then under it, when anything came into his head, he wrote hastily without reference to notes his recollections of the person; this was usually done in the morning, often in the midst of sickness following a night's drunken debauch, and rarely revised. Harvey had been dead twenty-three years when this oft-quoted tale of what he said about Bacon, who had been dead fifty years, was jotted down in this manner by a gossiping drunkard who owns that he wrote "tumultuarily." Look at it as we may, it is worthless as evidence as to what sway Bacon had over Harvey. Indeed, Andrew Clark, Aubrey's editor, says: "Aubrey's *Lives* supply an inviting field for comment, correction, and addition. But, even so treated, they will never be a biographical dictionary. Their value lies not in statement of biographical or other facts."[24]

It has been implied that, because Harvey is nowhere mentioned by Bacon, we may infer that the two were not in accord. In a notebook of Bacon's under the date July 26th, 1608, he says he must ask for opinions about his scientific work from the physicians Poe, Paddy, and Hamond, but there is nothing to show that he ever did this. He would hardly have asked Harvey, for he was then only 30 years old, and probably was, at that time, unknown

to Bacon.[25] I have looked through everything he wrote, and it is clear that he was interested chiefly in physical science, especially astronomy, but hardly at all in physiology. Many phrases having a physiological bearing are to be found in his writings, but they are all curious isolated statements; if an explanation of them is given it is not Bacon's—he merely reproduces the popular explanation. He collected hundreds of these statements for future investigation. Most we now know to be fantastic nonsense.

De Motu was published in 1628; Bacon died in 1626. Therefore he could not have alluded to the book. Harvey in his Lumleian Lectures began to teach his new doctrines not earlier than 1616, but there is no evidence that Bacon was ever present at these lectures; indeed, from 1616 to 1620 he was at the very busiest part of his career, and he certainly had no time then to attend lectures nor to pay much attention to rumours which might come to him saying that a great discovery had been made, especially as Harvey's experiments were then unconfirmed; indeed, if Bacon had asked doctors he would probably have been told that the new doctrines were nonsensical, for we know that many of the medical profession did not think Harvey's views worthy of discussion. So far from it being surprising that there is nothing in the *Novum Organum*, published in 1620, about Harvey's discovery which he began to teach, but only orally, some four years before, it would have been astonishing if there had been anything.

In *The History of Life and Death*, published in 1623, Bacon says, "the blood is that which irrigates the juices and membranes," and "the blood of the veins supplies the blood of the arteries."[26] It might be thought that these sentences show that he knew something of the circulation of the blood, but my strong opinion, judging by the context, is that he still knew nothing about it. Nor is this to be wondered at, for Bacon, after his release from the Tower in 1621, lived a lonely life away from London and so would not hear of Harvey's lectures. To sum up: the neglect of Bacon to mention Harvey is easily explained, and is of no value as indicating that the two were antipathetical.

It may be said that I have brought forward no direct proof of any influence of Bacon on Harvey; all my evidence is circumstantial. But two things are to be remembered: first, circumstantial evidence is often much stronger than direct; secondly, how little we know of the daily doings of people who lived three hundred years ago. Over and over again there is a reference in a letter to something Bacon had on hand but of the outcome of which we are completely ignorant. Spedding writes:

> "It is singular that of two men so remarkable in their several ways as Bacon and Coke, whose fortunes, objects, tastes, ideas, and dispositions crossed each other at so many points, and whose business must have brought them so continually into company and so frequently into conflict, the personal relations should be so little known. No anecdotes have been preserved by the news writers of the day which enable us to form a clear idea of their behaviour to each other when they met—the style of their conversation, or the temper of their courtesies."[27]

This being so it is not strange that we have no direct proof of Bacon's influence upon Harvey.

Gilbert's Influence.

Everything goes to show that Harvey was regarded with affection by his own profession. He speaks of his "very dear friend Dr. Argent"; we know of Ent's tenderness for and admiration of him, of Prujean's esteem for him. His generosity to this College tells us that the Fellows of it were his friends whom he much loved, but there is no indication that among these medical friends there was anyone of sufficient originality to help to mould Harvey's thoughts—with a single exception, namely, William Gilbert, one of the great original geniuses among the famous Elizabethans.

He was born in 1540 at Colchester, went to Cambridge, took his M.D. there, became a Fellow of St. John's, travelled abroad, settled to practise in London in 1573, ultimately living in Wingfield House, Peter's Hill. Sylvanus Thompson's[28] statement that his relations with English physicians were intimate and extensive must be correct, for Gilbert held several offices at this College, becoming President in 1600. He was well known outside his profession, for he attended many celebrated people and was physician to Queen Elizabeth; the story that she left him a legacy shows her liking for him. Gilbert and Dr. Lancelot Browne, in 1584, together signed a medical certificate which is preserved in the Records Office; in 1588 both were selected to advise the Privy Council about the health of the navy, and Browne held various offices at the College of Physicians; so, in one way and another, he must have known Gilbert intimately. Lancelot Browne's daughter married Harvey in 1604. Gilbert died in 1603. Considering the close acquaintanceship between Gilbert and Browne, Harvey must have heard much of the first and quite likely he met him when he was courting; anyhow it appears that he knew a good deal about him, for Sylvanus Thompson tells us that "according to Harvey, Gilbert expended no lesser sum than five thousand pounds on his researches." Therefore we may conclude that, for both professional and family reasons, Harvey would be inclined to pay attention to anything Gilbert said.

Gilbert's outstanding position is due to this: he broke away from tradition, he challenged authority, he went to Nature herself, investigating her by experiment, and he employed proper inductive reasoning. The first words in the preface of his famous book on the magnet are:

> "In the discovery of secret things and in the investigation of hidden causes, stronger reasons are obtained from sure experiments and demonstrated arguments than from probable conjectures and the opinions of philosophical speculators of the common sort; . . . But if any see fit not to agree with the opinions here expressed and not to accept certain of my paradoxes; still let them note the great multitude of experiments and discoveries—these it is chiefly that cause all philosophy to flourish; and we have dug them up and demonstrated them with much pains and sleepless nights and great money expense."[29]

This book made Gilbert the father of experimental philosophy in this island; it is the earliest known work treating of both magnetism and electricity; few finer examples of inductive reasoning have ever been presented to the world; there is abundant testimony that it produced a deep impression, not only in this country, but throughout the civilized universe; it places Gilbert on a level with Harvey, Galileo, Gassendi, and Descartes.[30] Galileo says:

> "I extremely praise, admire and envy this author for that a conception so stupendous should come into his mind. I think him moreover worthy of extraordinary applause for the many new and true observations he has made."[31 32]

Sir Kenelm Digby writes: "by means of whom [Gilbert] and of Doctor Harvey our nation may claim even in this latter age as deserved a crown for solid philosophical learning."[33]

Coming down to modern times, C. W. Cooke tells[34] us that *De Magnete* inaugurated a new epoch in physical science; its author announced discovery after discovery, all made by a series of experiments conducted in a most philosophical manner. He was the first electrician, he was the first to investigate electrical phenomena, and the word "electric" was coined by him. Sylvanus Thompson considers that Gilbert made twenty separate experimental discoveries in electricity alone.

It will not be amiss, before we leave *De Magnete*, to glance at the short reference to medicine to be found in it. In Book I, Chapters xiv and xv, Gilbert[35] ridicules the medical nonsense which has been talked about the loadstone—such as that, in small doses, it preserves youth; that smeared with garlic it ceases to be active; that when pulverized, and then buried in a plaster, it will draw an arrow from the body; that it will cure all sorts of headaches. He sums up by saying, "Thus vainly and preposterously do the sciolists look for remedies when ignorant of the true causes of things." Chapter xv treats of the medicinal virtue of iron. Gilbert is aware of its use in chlorosis, for "it restores young girls when pallid, sickly and lacking colour, to health and beauty." Malaria was very common in England in his time, hence we find Gilbert advising iron for enlarged spleen; the patients improved, probably because the iron benefited their anaemia. He notices that it is astringent. These are its only medicinal virtues. This is an excellent account

of the therapeutics of iron; we know but little more now. Gilbert is very sarcastic about the many ridiculous claims made for it by doctors. He says: "Thus do the smatterers cross swords together, and puzzle inquiring minds by their vague conjectures, and wrangle for trifles as for goats' wool, when they philosophize wrongly." In Book II, Chapter iii, he points out that Galen errs in believing that whatever agents draw out the venom of serpents exhibit the same power as the loadstone; he is emphatic that drugs do not act in this way. These extracts show him to have been what was very rare in his day—namely, a scientific physician, believing no more than he sees, and scornfully disbelieving the rubbish that passed for medicine.

The Advancement of Learning appeared in 1605, two years after Gilbert's death, so it cannot have been of use to him, and the only one of Bacon's writings which can have been published before 1600, when *De Magnete* appeared, is *Partus Masculus Temporis* (The Male Birth of Time), but the date of this, which is only a fragment, is doubtful. There is no trace of any acquaintance between Gilbert and Bacon: therefore we must admit that there is nothing to show that the last can have affected the elder; consequently the glory of being the first, in this country at any rate, to break through the bonds of authorities and properly to use experiments and induction belongs to Gilbert. Considering his professional position, his sound medicine, his close acquaintance with Harvey's father-in-law, the fact that his arresting book appeared just when Harvey was beginning his medical work, that it was just such as would appeal to the discoverer of the circulation (for it, by example and precept, taught that the right way to investigate nature was by experiment and induction), and that Harvey's recreation was mathematics—bearing in mind all this, it is not unreasonable to believe that Gilbert helped to direct Harvey's thoughts.

The Atmosphere in which Gilbert, Bacon, and Harvey lived.

Hitherto we have only considered Bacon, Gilbert, and Harvey individually, but in what atmosphere did they live? Sir John Edwin Sandys tells us that "the love of discussing on learned and philosophic topics was one of the characteristics of serious society in the Elizabethan age."[36] Sir Sidney Lee and Dr. Furnivall both say that the era of Elizabeth was that of learned culture and a desire for knowledge among large numbers of the people.[37] Several accounts have been given of the Society of Antiquaries, founded in 1572. It was a great success: "Peers and commoners, diplomatists and exchequer officials, heralds and city tradesmen, country and town gentlemen, schoolmasters, lawyers and clergymen, all met together, week by week to discuss archeological and constitutional problems."[38 39 40] At the same time there was another learned society which met at Gilbert's house on St. Peter's Hill. Sir Humphrey Gilbert, half-brother to Sir Walter Ralegh, laid before Queen Elizabeth a scheme for the erection of "An Achademy for educacion of her Maiestes Wardes and others, the youth of nobility and gentlemen." It was to have been a real University of London; there were to be dozens of well paid teachers, including one in natural philosophy, and there was to be one doctor of physic. His duties I will give in the old spelling. One day he was to reed phisick and another surgery, in the English tongue. He was never to alleage any medicine of any kind, but that he was to declare the reason philosophical of every particular, and he was to show how the medicine was made and all the instruments used in making it. The physitian was to practise surgery because there were very few good surgeons, for surgery was only to be learned in barbers' shops, which was most dangerous. The physitian was continually to practise with the Natural Philosopher to try and search out the riddles of nature; they were to share a garden for the growing of simples, and for this they were to have an extra allowance.[41]

Learning was evidently much in men's thoughts and in their conversation. Therefore on this ground also we may reasonably conclude that Harvey would have knowledge of the teaching of Gilbert and Bacon.

Many who have written about the glorious Elizabethan renaissance have told us of its literature, its theatres, its politics, its statesmen, its voyagers, and its romance, but few have dwelt upon its science. Until the closing years of the great queen's reign ignorance, superstition, tradition, and false reasoning darkened understanding; but then, as with other branches of human activity, so with science, great lights arose in this country—Gilbert, Bacon, and Harvey; men's minds awoke; the science of electricity was founded, we were taught how to reason, and modern physiology was born. English science dates from these three who were contemporaries; fortunately they were not, like Galileo, Bruno, and others, persecuted on account of the novelty of their pronouncements. The Elizabethan era is an example of the well known, singular phenomenon that there are periods in which a cluster of geniuses appears, and this College can justly be proud that two of its Fellows may be grouped with Shakespeare and a few others among the greater Elizabethans. Harvey's supreme eminence among scientists is so well acknowledged that there is no need for me to extol it. Rather have I tried to show that, not only was he a star of the first magnitude himself, but he was also part of one of the brightest constellations the world has seen. No man can certainly say what makes any man's mind, but, for the reasons brought forward in this address, it does seem likely that, as Harvey was the youngest of these three, the other two had some directing effect, of which Harvey was perhaps unaware, in steering his thoughts correctly towards that goal the reaching of which has made him one of the great men of all time.

All three were parched with a thirst for knowledge, and it would be difficult to find a better epilogue to this oration than a quotation from the *Praise of Knowledge*, a masque written by Bacon and performed before Elizabeth in 1592:

"Therefore no doubt the sovereignty of man lieth hid in knowledge wherein many things are reserved which kings with their treasure cannot buy, nor with their force command; their spies and intelligencers can give no news of them; their seamen and discoverers cannot sail where they grow. Now we govern nature in opinions but are thrall to her in necessities. But if we would be led by her in invention we should command her in action."

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THE TOBACCO HABIT.

BEING THE NORMAN KERR LECTURE DELIVERED BEFORE THE SOCIETY FOR THE STUDY OF INEBRIETY,

BY

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NICOTINE, next to caffeine, is the alkaloid most widely used by man, and as in the last twenty years a truly enormous increase in the consumption of tobacco has occurred, it is right that a society like this, which concerns itself with every form of inebriety, should interest itself in the effects of smoking, both on the health of the individual and of the population as a whole. Disraeli[1] said "the youth of a nation are the trustees of posterity"; and if the numbers of men rejected as unfit for military service in the late war form any criterion of the physical efficiency of our sons, few can doubt that British stamina leaves much to be desired, if it is not indeed on the wane. I believe that no excuse is necessary for calling attention to certain known facts concerning tobacco smoking. The late Dr. Norman Kerr, whose memorial lecture I have the honour to deliver to-day, wrote on some of the evils of tobacco, and especially its action in producing eye defects.

HISTORICAL.

Europe learned the use of tobacco from the American Indians. Tobacco is an Indian word, but nicotine is named after the French Ambassador in Lisbon, Jean Nicot: he grew tobacco seed in his garden, and vaunted the leaves as a cure for all external diseases. Snuff obtained from Nicot was introduced by Catherine de Medici at the French Court about 1560 as a specific for headaches.

Tobacco was brought into this country by Ralph Lane in 1586; he taught its use to Ralegh, who became a devotee, did much to popularize it, and carried his habit even to the scaffold. By the seventeenth century the use of tobacco had spread to almost every European country.

A reaction against its use arose in the fifteenth and sixteenth centuries. James I published in 1603 a pamphlet entitled "Misocapnus seu de abusu Tabaci Lusus reginus," in which he says:

"O cives, si quis pudor, rem insanam abjicite, ortem ex ignominia, receptam errore, frequentatem stultitia: unde et ira numinis accenditur, dignitas gentis senescit domi, vilescit foris; rem usu turpem, olfactu insuavem, cerebro noxiam, pulmonibus damnosam, et si dicere liceat atri fumi nebulis tartareos vapores proxime repraesentantem."

The Tsar Michael punished his soldiers with the rack and knout for smoking; Urban VIII forbade the use of tobacco in any form in church during divine service. How serious must have been the abuse of tobacco in Spain in 1642 may be gauged from the apostolic brief which tells us that the priests chewed tobacco during service, contaminated the vestments with expectoration, and filled the church with fumes. Benedict XIII, himself a snuff-taker, rescinded the prohibition in 1724, but ordered that the use of tobacco in the Church of St. Peter at Rome should cause no disturbance; smoking was consequently excluded, though I believe that the use of snuff is allowed in Catholic churches to-day. Nevertheless, neither the King's book, the Czar's knout, nor the Pope's proclamation seriously affected the use of tobacco.

To the Puritans in England of the seventeenth century smoking was the mark of the drunken Cavalier. Nevertheless, the Roundheads later indulged, since Evelyn states that the soldiers took tobacco at Cromwell's funeral. The association of smoking with the roisterer and drunkard prevented its acceptance in society till the end of the eighteenth century. During the Regency the meerschaum and cigar appeared in the streets, but in no clubs except the military. Cigarettes reached us from Spain. A Greek, John Theodori, who settled in Leicester Square in 1861, was the first to make them in this country, and, being more portable and easily concealed, they quickly invaded the home. Nevertheless, it was not really till post-Victorian days that the respectability of smoking was established. Women were the most bitter opponents of tobacco till this time; with their emancipation about a third of the women started to smoke, and now it is even unusual for either a maid or matron to abstain.

The use of tobacco, then, has become universal throughout the world. In this country no serious attempt has been made to determine its effect on the public health. America has been more active. Miss Lucy Gaston, under the auspices of the Anti-cigarette League, has been instrumental in organizing several national congresses. The twentieth amendment to the Constitution of the United States of America, which has never been ratified, provides that: (1) The manufacture, sale, transportation, inhalation or otherwise consumption of cigars, cigarettes, pipe tobacco, cut plug, and snuff is hereby prohibited. (2) The Congress and the several States shall have concurrent power to enforce this article by appropriate legislation, and to appoint enforcement officers in every community.

COMPOSITION OF TOBACCO SMOKE.

The smoke emitted from any smouldering vegetable matter, including tobacco, contains ammonia gas and pyridine or pyridine derivatives, and it is these substances which produce the irritation of mucous surfaces not infrequently observed in those who smoke; these bodies are responsible for the morning cough, the irritation of the throat and tongue, and the conjunctivitis of the cigarette smoker. They are in every respect objectionable products and add nothing to the pleasure of smoking. If they could be excluded from the smoke it would be all to the benefit of the smoker. Other dried herbs—such, for example, as coltsfoot leaves, at one time sold as a boys' tobacco which was harmless—often produce more pyridine when allowed to smoulder than tobacco, but they have none of its calming effects.

The pyridine bases are oily volatile liquids, intensely irritant, but, compared with nicotine, of a relatively low toxicity.[2] Their poisonous nature I have demonstrated on young volunteers, who were required to smoke coltsfoot leaves; after smoking for some time (twenty to thirty minutes) they suffered from nausea, vomiting, and diarrhoea, with all the signs of early shock.[3] Nevertheless in tobacco smoking the only serious effect of these bodies is the local irritation, since their specific effects are insignificant in comparison with those of other substances which are present in this smoke.

CARBONIC OXIDE.

Another substance obtained from the slow combustion of almost any vegetable matter, including tobacco, is carbon monoxide, which is also the poison of coal-gas and the exhaust gas from motor cars.

In New York and Newhaven, where the motor traffic is dense, CO can be detected in the air of the streets.[4] The traffic control men not infrequently suffer from headache, slight nausea, muscular weakness, and rapid pulse, which are the usual symptoms of CO poisoning. Wilson and others[5] examined the blood of fourteen foot traffic patrol men and found that it contained from 0 to 30 per cent. of CO, whilst six of these men showed values of from 20 to 30 per cent. Two other symptoms which are also prevalent are dizziness, and, more rarely, dimness of vision.

The United States Bureau of Mines made experiments to determine the CO present in a confined space after intensive smoking, and found that the CO concentration of the air of the room did not rise to more than 0.01 per cent., and the maximum blood saturation of the subjects exposed to this atmosphere was only 5 per cent. Nevertheless this is more than enough seriously to affect sensitive people. When the amount of this gas is determined in the smoke of cigars, cigarettes, and pipes under conditions simulating as far as possible those obtaining during ordinary smoking the figures obtained are somewhat alarming.[6] The cigarette smoke yields from 0.5 to 1 per cent.; the pipe 1 per cent. or more, and the cigar 6 to 8 per cent.; this last, as

Professor Armstrong points out, is roughly the proportion of CO in the coal-gas of the South Metropolitan Company. The amount of CO varies naturally with the rapidity of the smoking and the closeness of the packing—the quicker the smoking the more CO.

Tobacco smoke, however, reaches the mouth freely diluted with air, and the amount of CO absorbed from the buccal cavity is negligible, so that pipe and cigar smokers who do not inhale have little to fear from this poison. Cigarette smokers who inhale would absorb a large proportion of the CO which reaches the lungs, since the affinity of CO for blood is more than two hundred times that of oxygen. Cigarette smoke as it reaches the mouth of the smoker may contain as much as 7.2 to 25 parts of CO in 10,000 parts of air (Baumberger). Inhaled for one hour at the rate of five puffs a minute this should be enough to affect appreciably the blood haemoglobin. Many years ago Fokker asserted that animals placed in an atmosphere containing tobacco smoke died from CO poisoning. Hartridge[7] found 6 per cent. CO in the blood in one cigarette smoker who was by no means excessive in his habits. The normal healthy man does not in most cases show symptoms of CO poisoning until 15 to 20 per cent. of his haemoglobin has been fixed and put out of action. Yet there are many people who show a supersensitiveness to this poison, just as some of us have some idiosyncrasy for quinine or iodides, and so it is not difficult to appreciate why cigarette smokers may exhibit a syndrome indistinguishable from that of mild CO poisoning.

The toxic concentration of CO in the atmosphere is about 0.05 per cent.; in men exposed to dilute concentration, such as 0.02 per cent., the degree of haemoglobin saturation would be perhaps somewhere near 20 per cent.[7A]

NICOTINE.

The third and by far the most important constituent of tobacco is the volatile alkaloid nicotine. The effects of cigar and pipe smoking are due practically entirely to nicotine, which exists in tobacco combined with organic acids. During smoking these salts are largely dissociated, a part of the nicotine being burnt and a part passing in the smoke as free nicotine. The drier the tobacco the greater the destruction of the nicotine. Moist tobacco produces much more serious effects than dry tobacco, and it has been stated that the moistness of the tobacco is responsible for many of the evils. The water content of the tobacco is much more harmful to the smoker than the original nicotine content of the tobacco.

During the slow combustion of a cigar as in ordinary smoking there is an area immediately behind the point of combustion in which the water and other volatile substances condense. During aspiration the hot gases are drawn through this hot moist area and carry with them the volatile principles, of which nicotine is the most important. Hence the smaller this moist area behind the point of combustion—which means, the cooler the smoke or the more complete the combustion—the less likely is the smoke to contain volatile toxic bodies. It follows that a cigarette or slender cigar which is well cooled will yield fewer of these products than a thick cigar, and many smokers can testify that a fat cigar has a much greater effect than a long slender cigar of similar tobacco. This also explains the unpleasant effects of relighting a half-finished cigar or pipe.

The same principle is exemplified by the following fact. Virginian tobacco leaf from which cigarettes are made often contains double the amount of nicotine that is present in Manila cigars. Yet when an equal weight of the cigarettes and cigars is smoked the total cigar smoke contains double the amount of nicotine present in the cigarette smoke. The condition of the tobacco and the form in which it is smoked are more important factors in determining the amount of nicotine in the smoke than the amount of nicotine present in the original tobacco.

The species of plant mostly used is *N. tabacum*, but several other species are employed; thus *N. rustica* yields Turkish tobacco; different varieties of tobacco from the same species also show different amounts of nicotine. During the process of curing the leaves, which consists in exposing them under cover to a considerable degree of heat, important chemical changes occur, the leaves become moist and their fragrance alters. There is much room here for further investigations, with a view to producing a tobacco which when smoked would yield in the smoke the minimum of alkaloids, pyridine, etc., whilst retaining its aroma. Tobacco may contain anything from 1 to 8 per cent. of nicotine; Havana tobacco has about 1.5 per cent.; Maryland 2 per cent.; Virginia 6 per cent.; Kentucky 8 per cent.

AMOUNT OF NICOTINE IN SMOKE.

The amount of nicotine in tobacco is no criterion of the amount in its smoke. For example, mild honeydew contains only 1.6 per cent., whilst Cavendish may contain as much as 3.8 per cent.; if these two are smoked under identical conditions the Cavendish naturally yields the larger amount of nicotine in the smoke. But Cavendish smoked in a cool pipe or one provided with a filter will affect the smoker less than the honeydew smoked in a hot pipe. In the churchwarden pipe the opportunity for the nicotine to condense is such that the smoke is almost freed from the alkaloid; and I have already pointed out that in cigar and cigarette smoking the degree of moisture, the tightness of packing, and the thickness of the cigar or cigarette are the most important factors in determining the amount of nicotine which will be present in the smoke. Habermann[8] and Ehrenfeld state that two-thirds of the nicotine of some kinds of cigars passes over in the smoke; with other brands as little as one twenty-fourth passes over. Lehmann[9] obtained nicotine from the air of a room in which tobacco was being consumed, showing that the smoke puffed out is by no means denuded of all its alkaloid. He thinks from his calculations that only about 1.4 mg. nicotine is absorbed from a cigar. This figure depends on so many conditions that it cannot be accepted—for example, the length of time that the smoke is held in the mouth, thus affording time for absorption, would exert an enormous influence. Our own observations suggest that the figure is ten times too small. The collapse which I have seen in youths smoking a Manila cigar could not have been produced by the absorption of such an amount.

Asherton (1919) says that 6 to 8 mg. of nicotine reach the mouth from a cigarette smoked in the usual way. We are not told, however, how much of this is likely to be absorbed. In our own observations, using a standard Virginian cigarette weighing 1 gram and aspirating the smoke through solvents once in twelve seconds, and using only three-fourths of the cigarette, it was found that 3 mg. of nicotine were absorbed. It must not be assumed that all this is necessarily absorbed into the system, but in the case of an inhaler most of it certainly is, perhaps 75 per cent., since expectoration is no longer permitted and loss can occur through the exhaled smoke only. Hence if a cigarette smoker were to puff ten cigarettes on end he would certainly absorb 20 to 30 mg. of nicotine—enough to produce a profound physiological effect, though, administered in this way, perhaps ten to fifteen times under the lethal dose. The amount of nicotine in pipe and cigar smoking is much higher. In our experiments cigar smoke contains about twice as much nicotine as cigarette smoke.

Other constituents of tobacco smoke are less important. The solids of cigarette smoke weigh about 10 per cent. of the tobacco burned—that is, 80 mg. for each cigarette. Cyanides and sulphocyanides are present in traces; arsenic is a constituent of American tobaccos in amounts many times greater than those permitted in foods. Pipe tobacco is reported to contain the equivalent of from 0.05 to 0.27 grains As_2O_3 per lb.[10] When smoked probably about half this will be absorbed.

These facts show that nicotine is a most important constituent of tobacco. It is one of the most fatal and rapid poisons known; it acts as quickly as prussic acid, and two drops placed on the tongue of a dog will kill it almost immediately. The lethal dose for a man is 60 to 120 mg. The nicotine present in one cigar if injected intravenously would represent two fatal doses to man. It is therefore somewhat remarkable that fatal nicotine poisoning is not more common. Nevertheless the careless use of

tobacco infusions in enemas, the occasional swallowing of tobacco leaves, or even carrying tobacco leaves next to the skin for smuggling purposes, have all led to fatal results.[11] Tobacco has also been used for criminal purposes,[12] but as it does not appear to undergo fermentative changes in the cadaver it can be detected in the bodies of animals three months after death.

Denicotinized Tobacco.

If tobacco is heated at a temperature over 100° it gives off an empyreumatic oil which was official in the *U. S. Pharmacopoeia* of 1870 as oleum tabacci. This oil is rich in nicotine, has an odour resembling foul pipes, and is extremely toxic. Various methods have been adopted to eliminate the nicotine from the smoke and the juice which is apt to form in pipes. A porous substance may be put into the stem of the pipe; the space for cooling and condensation may be increased, or some substance which facilitates oxidation may be placed in the bowl of the pipe. These last pipes are called catalytic, and the bowls are lined with some metallic oxide, like that of platinum, in a fine state of division. By passing tobacco smoke over the catalyser formol is formed and the nicotine and pyridine derivatives are decomposed. These pipes have not, however, found favour.

Another method of improving tobacco consists in removing some of its nicotine by means of solvents. These so-called denicotinized tobaccos have 50 per cent. or more of their nicotine removed, and have been regarded therefore by physicians as relatively harmless, at all events as far as their nicotine is concerned.[13] Unfortunately this is not the case, because it has been shown that these denicotinized cigars yield in their smoke as much nicotine as was present in the same class of cigar before denicotinization.[14]

Improved methods of removing the nicotine are, however, now being experimented with abroad. Boxes of cigarettes and tobaccos in various forms are treated with superheated steam; by this means practically the whole of the nicotine is said to be removed and the tobacco is left nicotine-free; the nicotine has a ready sale for agricultural purposes. I have had no opportunity, however, of experimenting with these products.

It will be obvious from this that great opportunities exist for investigating and improving tobaccos. Tobacco is a substance foreign to the body and its alkaloid is poisonous; the user pays heavily for his vice in taxes, and it is surely not unreasonable that he should have some further guarantee of the quality of the material which he buys than that provided by the 1842 Act. I am not suggesting that tobacco should be guaranteed to contain not more than a specified amount of nicotine, in the same way as spirits are standardized for alcohol; but as tobacco is similar to alcoholic beverages, in that excess of both leads to serious results, the public should have some sort of guidance or protection. It is almost certain, for example, that it is the moistness of the tobacco which is indirectly responsible for many of its most serious effects; that the pyridine derivatives are largely responsible for morning cough, which leads later to chronic bronchitis and cardiac failure. These are conditions which at least are capable of improvement. The Ministry of Health, which has already done much for providing pure foods of a certain standard, will, I hope, before long see in tobacco an important factor in the public health.

Action of Tobacco Smoke.

Tobacco used in any form possesses irritant properties; this is, of course, obvious with snuff, the use of which depends on stimulation of the fifth nerve endings. The same action occurs in chewing, which excites reflex salivation. If five or six grains of tobacco are swallowed vomiting occurs. Tobacco is irritating also to the skin, and the alkaloid in it is readily absorbed. Many cases of poisoning are on record, and I have in mind particularly a child of 8 years, suffering from tinea capitis, to whose head the expressed juice of tobacco leaves was applied; the treatment was shortly followed by death. Several cases of tobacco poisoning through the skin are reported in the British Medical Journal for 1926. Garvin in 1913 described the case of a girl aged 6 years who died forty-five minutes after receiving an enema of 24 grains of tobacco. From an examination of such cases it is clear that death may occur from three minutes to several hours after using tobacco as an enema or for application to the skin.

Continuous smoking for several years not infrequently produces signs of chronic irritation in the mouth, throat, and larynx—sore tongue, morning cough, hoarseness, tonsillitis, or chronic bronchitis. I believe that these effects are most marked in the cigarette inhaler. When the smoke is concentrated on one portion of the tongue for many years, which may occur especially in pipe smoking, this constant irritation is said to favour the formation of epithelioma of the lip and tongue if the quantity consumed is large or the smoker predisposed.[51] The evidence in support of nicotine taking any part in this action is certainly not conclusive. Nevertheless, Bottini mentions one hundred cases of cancer which he saw, including three women, which were caused by smoking or chewing tobacco. On the other hand, the Registrar-General's report shows a remarkable fact to which attention has not been drawn previously—that tobacco manufacturers have a lower death rate from cancer than those of any other trade.

Smoking is reputed amongst the public to have an antiseptic action, and is sometimes indulged in nominally for this purpose. Pepys describes the use of tobacco during the plague, and its use was compulsory at Eton in 1721 as a prophylactic against "the apprehension." Puntoni[15] and others have shown that tobacco smoke has a strong disinfectant action *in vitro*. When the smoke is drawn into the mouth, however, the action is attenuated by the saliva and mucosa, and its antiseptic effect is negligible. The action *in vitro* is not influenced by filtering the smoke free from nicotine by passing it through cotton-wool.

Specific Action.

Smoking is, however, indulged in by man because of its sedative action, and this is due solely to nicotine absorption. Nicotine stimulates all nerve cells throughout the body without exerting any kind of selective action, and the stimulation is followed by depression. The time the stimulation lasts depends on various factors, but as a rule it coincides with the absorption of the nicotine—that is, with the period of active smoking. Both the pleasures and evils of smoking are intimately connected with nicotine. Morphine, heroin, cocaine, and other drugs of addiction have a selective action on the central nervous system alone; nicotine is different, it acts also on the autonomic nervous system, and it is this action which produces objectionable effects in the sensitive or excessive smoker.

Alimentary Canal.

The commonest symptoms of smoking are loss of appetite and chronic intestinal catarrh. The smoker's lack of appetite, Sir Humphry Rolleston thinks, is not altogether an evil, since it limits the consumption of unnecessary food. Nicotine, and tobacco smoking, by stimulating the autonomic ganglia, increase the secretion of the alimentary glands, and later, after the smoking has ceased, depress them; hence the salivation during smoking and the dry mouth the following day. The same fact is true of gastric secretion. Experiments have been made on dogs with a Heidenhain's fistula, by means of which the secretion of gastric juice may be collected and examined as desired. Injections into these animals of nicotine or saline solution through which smoke has been passed afford a means of determining accurately the effect on gastric secretion. Both affect the dog in the same way, and cause at first a decided increase in gastric secretion.[16] It is well recognized that in certain persons excessive smoking leads to this gastric hypersecretion; hyperacidity is the most common disturbance, and gastritis acida is one of the most frequent results. Hurst[17] believes that tobacco smoking is one of the most frequent causes of hyperchlorhydria. Rolleston[18] lays considerable stress on the relative sensitiveness of the individual as an important factor in determining whether or not a heavy smoker will pay the penalty of gastric disease.

On the musculature of the alimentary canal the action

of tobacco is equally well marked, the automatic movements are first inhibited and later augmented, as a result of stimulation and later depression of the autonomic nervous system.[19] The inhibitory stage is almost coincident with the period of smoking, and is associated with contraction of the pyloric and ileo-colic valves. Stimulation of the sympathetic nerves causes inhibition of the whole alimentary canal with the exception of these two valves, which are contracted. The dyspepsia often following on a hypodermic injection of morphine is probably due to this pyloric contraction, which delays the passage of food. Morphine in this respect shows some similarity to nicotine. The mild laxative action of tobacco smoke may be explained by the ultimate depression of the inhibitory cells whereby the motor nerves assume an undue influence on the automatic movements.

Hunger is due to certain well recognized automatic contractions of the stomach; smoking definitely inhibits these. Hence continuous smoking staves off the pangs of hunger, and acts in this respect like the drugs of addiction —cocaine and morphine. Careful experiments which have been made on habitual smokers and non-smokers with the aid of bismuth and *x* rays show that the effect of smoking a cigar is to stop the normal automatic movements of the stomach within fifteen minutes. The inhibition continues until about three minutes after smoking has ceased, when the contractions begin again.[20] In these experiments it was also shown that nausea and vomiting from excessive absorption of nicotine may occur at a time when the stomach movements are completely inhibited.

Tobacco smoking, then, has a very definite action on the alimentary canal. In certain sensitive people it produces effects which, according to Hurst, favour the production of duodenal ulcer, whilst Wagner[21] insists that excessive smoking can produce all the subjective and *x*-ray appearances of this condition.

Circulation.

The considerable use of tobacco in any form invariably produces certain definite effects on the circulation which cause no inconvenience of any kind to the subject; these should be distinguished from other effects which only occasionally occur, but are then often sufficiently distressing to induce the sufferer to seek medical advice.

Under the first group must be included changes in the pulse rate. All observers are agreed that the use of tobacco increases the pulse rate from five to ten beats a minute, and in the case of the man who is continually smoking the increase of rate becomes permanent, but this condition produces no apparent disadvantage.

When the novice or moderate smoker puffs a cigar the rate of the pulse increases in a few minutes. Lee,[22] working in my laboratory, demonstrated this clearly both in the novice and moderate smoker under strict experimental conditions. In another series of experiments twenty-eight young healthy smokers were required to smoke a single Turkish cigarette; the pulse rate increased in all but four, and sixteen showed an increase of more than eight beats a minute.[23] Hesse[24] obtained similar results with cigars on twenty-five patients suffering from various chronic diseases.

During the war it was generally asserted that excessive smoking, particularly of cigarettes, was the common cause of the so-called D.A.H. Observations were made which showed that the average pulse rate of the patients during smoking was nine beats a minute higher than before smoking; in ten healthy controls it was six higher.[25] As there can be no question that the effect is due to nicotine, inhalers of cigarette smoke should show more acceleration than non-inhalers. In Parkinson's twenty patients the ten inhalers showed an average increase of pulse rate of eleven a minute and the ten non-inhalers of seven.

This increase in the pulse rate is associated with a small rise in blood pressure; for the moderate smoker the rise does not usually exceed 20 mm. of Hg systolic, and 8 mm. of Hg diastolic, and is usually even less. The rise begins a few minutes after the smoking has commenced and is maintained throughout the smoking period.[24 26] It is only in the case of the novice or after excessive smoking that the blood pressure falls to any extent below normal after the smoking has ceased; but under certain conditions the fall may be so severe as to cause all the signs and symptoms of shock or collapse.[22]

Observations have also been made to determine the effect of smoking continued over a period of six months. Nicolai and Staehelin smoked six or eight cigars a day for six months. They then gave up smoking, except for an occasional cigar, for a further six months. Their average pulse rate was 74.5, compared with 81.8 during the smoking period.[27]

These changes from the normal are, after all, usually small and give rise to no symptoms, but the evidence available suggests that they cannot be regarded with indifference. It is a maxim with those who are in training for athletic events that smoking must be entirely eschewed. This prohibition, no doubt adopted in the first place as the result of experience, has become a tradition. In Nicolai's experiments the acceleration of the pulse which occurred after the performance of a measured amount of work with the ergograph was considerably greater during the smoking period, while recovery to the normal rate was much slower than during the period of abstinence. Parkinson and Koefod also showed that smoking a few cigarettes can render healthy men more breathless on exertion, and that this effect was marked in soldiers suffering from D.A.H. This means that the heart even of the moderate smoker is less efficient in periods of strain. It is possible, then, that the prohibition of smoking for athletes is dependent on this vascular effect. With present knowledge it would be mere speculation to attempt to gauge the significance of this factor when continued over many years.

More Serious Circulatory Effects.

Of the more definite effects which cause patients to seek advice are palpitation and arrhythmia, which are relatively common in the young; they disappear if the smoking is stopped, though in pronounced cases, as the late Sir Clifford Allbutt pointed out, only after the abstinence has been continued for many months. The arrhythmia is functional and is usually due to extra-auricular systoles. Neuhof mentions fibrillation and flutter and sino-auricular block also; the block in the case he illustrated disappeared three days after smoking ceased,[28] but such cases must be very rare. Rolleston says that arrhythmia may occur at any age but is more noticeable after 50; this may be due to a loss of tolerance which is known to occur in later life.

Another symptom which may arise from excessive smoking in later life is anginoid pain, which, according to Osler, rarely approximates to true angina. Turney says that it is associated with vasomotor disturbances and tends to occur after meals or in the night rather than after exertion.

Arterio-sclerosis is easily produced in animals, especially rabbits, by the injection of nicotine, and we have ourselves produced marked arterial changes in the aorta and larger arteries of animals by administering to them "smoke water"; but I do not think that these experiments are proofs that smoking leads to arterio-sclerosis in man, although there is a consensus of clinical opinion that immoderate smoking favours arterio-sclerosis. Pawinski[29] states that 42 per cent. of 1,000 cases of coronary sclerosis had histories of immoderate smoking.

In severe cases the cardiac irregularities may lead to syncope, and an undue proportion of sudden deaths during the middle period of life, without any definite lesion found *post mortem*, is said to occur in heavy smokers.[13] As even the most moderate smoking places some disability on the heart, trifling though it be, it may well be that this view deserves serious consideration.

Central Nervous System.

Nicotine is essentially a nerve poison, but so far consideration has only been given to its action on the cells on the course of the autonomic system, and this action is responsible for the digestive and circulatory effects. But nicotine affects the brain and cord also: it increases spinal reflexes and removes certain inhibitions.

I have already drawn attention to some of the effects

of excessive cigarette smoking in the young, the attacks of giddiness, and the tremors. A large experience of examination papers of medical students enables me to pick out with certainty the heavy cigarette smokers, from the irregular character of their writing. If the habit is broken the writing at once improves and the vertigo disappears. These effects are exactly those of CO poisoning, and I believe can be explained on this basis.

Habitual smokers are agreed that the weed acts as a mild sedative to the central nervous system; the type of action is of a somewhat remarkable character and may offer an explanation of the widespread use of tobacco. Physical fitness or well-being is determined by our feelings, which are the result of sensations. If response to sensation varies from the normal, whether on the hypo or hyper side, rest causes a return towards the normal, and smoking is said to exert a similar effect, though of a more marked description; hence the sedative effect of tobacco in conditions of irritation, and the stimulating effect in those of weariness and depression. The experiments from which these statements were deduced consisted in determining the threshold to single break induction shocks of two fingers immersed in saline solution. After this figure was determined the subject smoked two cigarettes and his threshold was re-examined. If the initial threshold was low, smoking depressed it on an average 72 per cent. On the other hand, if the initial threshold was high, smoking lowered it on an average 28 per cent. Suitable controls were made with cubebs cigarettes, which always acted as a stimulant. This shows also that the tobacco action is due to nicotine.[30] In the same way smoking tends to nullify the slight sensory depression produced by the veronals, antipyrine, and other hypnotics.[31] So that it may well be that tobacco is helpful when the sensory threshold is abnormal.

Mental Efficiency.

Mental efficiency tests on the whole have not been very convincing. In Berry's experiments[32] smoking enabled his subjects to do more rapid and correct arithmetical addition; but the nicotine here was not the determining factor, the aroma, and holding an unlighted cigar, or chewing substances like gum all had some effect. Turney lays much stress on the importance of these tics. Carver's experiments consisted in applying eight established psychological tests in a number of people to determine whether cigars or cigarettes would influence their judgement and response to stimuli. The results suggest that smoking lowers the accuracy of finely co-ordinated reactions and association-thought processes. The speed of complicated reactions was, however, unchanged. The habitual smoker, when deprived of his smoke for some hours, showed diminished accuracy.[33]

Many observations have been made by merely comparing the efficiency, mental or physical, of smokers and non-smokers. All these experiments seem to me so difficult to interpret that their value is negligible. Generally they show some inferiority of the smokers. This is true of observations of scholarship,[34] endurance of telegraph workers,[35] scholarship and physical efficiency,[36] and resistance to tuberculosis.[37] The apparent inferiority may be the cause or the effect of the tobacco habit. Those who are handicapped by neurosis or other form of inferiority would succumb most easily to the euphoria of smoking.

The action of smoking on the performance of routine muscular work has also been examined, and it has been found that habitual smoking has no obvious effect on the output of work amongst glass-blowers, a moderately strenuous physical occupation, although chewing greatly diminished the output.[38] On the other hand, Lombard's experiments show that smoking diminishes muscular endurance both at the age of 35 and 60.[39] Using the ergograph, Palman found that cigarette smoking at first increased muscular work, but that fatigue set in earlier and the total work was less. A curious periodicity occurs in the ergograph records after smoking, due to fatigue or depression of the central nervous system.[40]

It must be conceded that ordinary smoking in normal people does not lead to nervous disturbances. Excessive smoking is another matter, and may produce anxiousness and insomnia. Every smoker knows that a stronger cigar than usual may keep him awake, though usually the effects of smoking are soothing and favour sleep. Neurasthenic subjects are easily affected by smoking; they are continually breaking off their smoking and returning to it again in a few weeks. They suffer from headaches, dizziness, and sudden sharp attacks of pain in the head, over the precordial region, or in the stomach, which cease when the smoking is stopped.[41] Neuralgias, generally stated to be localized about the intercostals, humoral and scapular region, are rare, but of importance, as the pain continues until the cause is removed.

The action of tobacco, then, on the central nervous system, when used in moderation, on the whole does no harm, and in subjects showing deviations from the normal it makes for good.

Amblyopia.

Tobacco amblyopia stands alone in mischiefs so grave. It was noticed by Mackenzie in 1835 and observed accurately by Hutchinson in 1864. The sight gradually becomes dim with central scotoma, some derangement of accommodation, and often dilatation of the pupil. This condition is associated with retrobulbar optic neuritis, and recovers if smoking is stopped; when degeneration has set in, however, abstaining from nicotine will only arrest further progress.[41a]

At one time those engaged in the manufacture of tobacco, in consequence of the absorption of powder, suffered from visual troubles. Dr. Norman Kerr stated: "In 3,000 workers in a tobacco factory 150 had eye defects, 45 being seriously affected." Galezowski, de Schweinitz, and many others have verified these facts. Nevertheless with improved sanitary arrangements these effects have now disappeared.

Androgué, in a critical analysis of 48 cases of amblyopia from axial neuritis due to nicotine, says the quality of the tobacco is at fault; it was imperfectly dried, which means that the percentage of nicotine in the smoke is much greater than usual.[42]

Tolerance.

The rapidity with which people become accustomed to nicotine is well known, but is none the less remarkable. The degree of tolerance varies in different people, but it is never absolute. Wahl in 1920 found that non-smokers suffered from nausea and vomiting after taking by the mouth 1 to 2 mg. of nicotine. On the other hand, smokers required more than 8 mg. to produce the same effect.

Various methods are known by which tolerance to drugs may be attained. Habitual dosing with a drug is sometimes met by diminished absorption, or the drug may combine with some substance which renders it non-toxic. Salicylic acid is rendered inactive by combining with glycocoll, though whether it is possible to attain a tolerance by this means is not known. Tolerance can also be attained by destruction of the toxic agent; here alcohol affords an example, for whilst it is true that all mammals can oxidize this body, the rate of oxidation may be increased by habit. This method of obtaining tolerance by destruction applies to alkaloids also, as was shown by Faust[43] for morphine, and Cloetta[44] for atrophine.

Many investigators claim that tolerance to nicotine cannot be produced in animals, but the methods employed were not of the kind which would show small degrees of tolerance. All the experiments, however, show that whatever the condition of the animal as regards tolerance, if nicotine can reach the tissue upon which it acts—that is, nerve cells—it produces its normal effect. This leaves only two probable explanations of the tolerance in man. The first is that nicotine is not absorbed in the tolerant man. Clinical evidence rebuts this supposition; it is well recognized that excessive smoking may produce toxic effects—alimentary, cardiac, and nervous—even in the most inveterate smokers. The second explanation is that the nicotine is destroyed as an active substance, but that the rate of destruction is limited.[45] If the destruction were carried out only slowly by the tissues, like the oxidation of alcohol and sugar, that would not necessarily prevent the nicotine exerting a physiological action; and if the rate of absorption exceeded that of destruction, a nicotine

action would certainly be obtained. When nicotine is introduced directly into the circulation the destruction within a few seconds would be negligible, and so the whole of the specific action would be obtained, no matter what the degree of tolerance.

The experiments of Lee and myself[46] were made on rabbits, and showed that repeated injections of nicotine into an animal give to the tissues, and especially the liver, an increased power of destroying the toxicity of the nicotine. It is easy to conceive of several ways in which this might be brought about, but some of these possibilities may be eliminated by experiment.

The loss of activity proceeds very slowly; this might be anticipated, for if it occurred rapidly a high degree of tolerance would be expected, and this never occurs. It does not then, *a priori*, seem likely that the cause of the loss of activity can be explained on the supposition of a chemical combination. The evidence rather points to some form of destruction of the nicotine, the process being possibly of the nature of a ferment action.

Although strong evidence exists in support of the view that tolerance means increased rate of destruction, yet there is some evidence suggesting that the nicotine is taken up specifically by certain tissues; Heger and others have shown that when nicotine is injected into the circulation of animals it disappears quickly from the blood and is taken up by the liver, from which it can be obtained by distillation.

Edmunds[47 48] made similar experiments to ours on dogs. He showed that the livers of all dogs possess some power of destroying nicotine, and suggested that the destroying agent is probably a ferment. Further, he says that it is possible that this ferment may be increased in quantity by the constant use of the alkaloid, but his experiments on dogs failed to prove it. The success or failure of these experiments depends, however, entirely on having adequate controls, and these are more difficult to obtain with dogs than rabbits. Fühner[49] thinks it is entirely unnecessary to assume tolerance at all. He points out that nicotine is excreted in the urine and that it is not cumulative; he neglects the clinical evidence.

Several clinicians have recorded cases showing a gradual drop in tolerance with advancing years. Turney and Rolleston both lay some stress on this. Finkelnburg says that patients, when once they have experienced symptoms of poisoning by nicotine, the particular form of which is immaterial, become more susceptible to the action, so that a smaller quantity of tobacco will reproduce the toxic symptoms. In this respect nicotine poisoning differs from most if not all chronic toxaemias produced by drugs. Rolleston also draws attention to the fact that disease—for example, influenza—may destroy an acquired tolerance.

Tolerance can exist also against CO. Animals such as guinea-pigs will live for months in an atmosphere in which as much as one-quarter of their blood haemoglobin is put out of action by combination with CO. They acquire a tolerance which is due to an increase in the corpuscles and haemoglobin, so that the oxygen capacity of the blood becomes almost normal. If such an animal is placed in a normal atmosphere it slowly loses its CO, its available haemoglobin increases, and it appears to suffer some discomfort. It is possible that the craving of the cigarette smoker after a period of abstinence may be not unconnected with this.

Why We Smoke.

I suppose few things are more difficult to analyse than the complex which gives rise to content, satisfaction, or positive pleasure. Any incident which breaks some simple habit acquired by long usage causes not only inconvenience but positive annoyance. The ritual of the pipe and cigarette soon becomes a most pronounced habit. The short duration of the cigarette leads to the frequent repetition of a series of complicated acts, culminating in the lighting up. The ritual of pipe smoking is even more likely to lead to a tic. To finger or suck an unlit pipe, to fill it, or to be repeatedly lighting it becomes in time a series of complicated reflexes which all go to make up the tic. I am informed that tobacco put up in cartons containing sufficient to fill the pipe, thus depriving the habitué of the ritual of filling, is not popular among smokers.

The element of rhythm plays its part: it is well recognized that with certain people some form of rhythmical movement facilitates thought and gives satisfaction. Dancing, singing, and chewing gum give satisfaction partly through their rhythm, and rhythm enters largely into smoking.

Sight and smell are other important factors. Sir Robert Armstrong-Jones[50] says that the cloud of white smoke rising before the smoker is soothing and companionable, and it is well known that people who become blind generally, but not quite invariably, give up smoking, and that smoking in the dark does not give the same satisfaction as smoking in the light. The fragrant smell and taste of good tobacco are also stimulating; so that taste, smell, and sight all take their part in the content. The amount of nicotine in the smoke is certainly not the determining factor in the pleasure; were this so we should employ moist cigars and so the more quickly satiate our desires; aroma is more important.

Pleasure, then, depends upon at least these factors: (*a*) reflex stimulation from the mucous membrane of the mouth and nose; (*b*) the tic complex; (*c*) the drug action, due mainly to nicotine, and perhaps to a smaller degree to the CO in the case of the cigarette smoker. The principal action of tobacco depends on the narcotic effect of the nicotine; it produces repose and calm—what I should term a stabilizing action. The cigar and pipe smoker, during a period of abstinence, feels the want of this customary effect.

The habit of smoking is sometimes referred to as an addiction. Rolleston[51] discusses this question, and all it is necessary to say here is that addiction is a relative term; the most powerful drug of addiction is probably heroin, and then follow cocaine, morphine, Indian hemp, opium, alcohol, and last tobacco.

A drug addict wishes to be freed from the cares and worries incidental to existence. To do this a drug must either depress the higher faculties of mind—judgement, self-control, inhibitions of all kinds—leaving free play for the lower and emotional centres; or the more primitive and emotional centres of the brain must be excited. Nicotine would most certainly be a drug of addiction were its action confined to the central nervous system, but it also acts on the autonomic system, so that when smoking is pushed—that is, when larger amounts of nicotine are absorbed—nausea, vomiting, diarrhoea, faintness, prostration, and collapse follow. The true addict is held in bondage by the fear of withdrawal and the craving which follows it. With tobacco this does not exist; the loss of one's smoke is an annoyance, but hardly a tragedy, and few cannot, when necessity arises, entirely abstain.

On Certain Economical Factors.

During the last fifteen years an enormous increase has taken place in the consumption of tobacco. In America the number of cigarettes consumed in 1914 was 3,000 million; in 1918, after the war, this had increased to 46,000 million; but the figure continues to increase, and in 1921 it reached 52,000 million. The *per capita* consumption of tobacco in the United States of America in 1920 was 6.3 lb.; in Great Britain it was 3.17 lb. Increased consumption appears to obtain in all European countries. In Holland smoking is especially prevalent. In 1924, 2,500 million cigarettes were consumed at a cost of 3½ million pounds; some statistics[52] show that of 100 boys aged 6 years, 30 smoked; of boys between 9 and 10, 50 smoked; and of 250 boys more than 11, 220 smoked.

In Austria a pamphlet was published in 1924 by several of the most distinguished Vienna doctors to their confreres which states that: "Nicotine promotes arterio-sclerosis and nervous diseases. In our country the cost of tobacco for one day equals the total annual deficit of all our tuberculosis sanatoria which it was necessary to close for economy." In Germany the total expenditure for the German army in 1912 was less than its smoking bill. As a further example of the cost of tobacco to a nation, Professor Farnum of Yale University has estimated that the United States of America in 1921 spent well over 300 million pounds on tobacco.

The Governments of the world are slowly appreciating

that the tobacco habit is not an unmixed blessing. England has passed legislation prohibiting the sale of tobacco to all minors under 16. Japan has a law prohibiting smoking by all persons under 20. The Austrian and German Republics are showing active interest against the further expansion of the tobacco habit, and most of the States in America have some form of legislation aimed at limiting the tobacco habit.

Conclusion.

Tobacco smoking serves as a mild stimulant followed by a slight degree of narcosis, the supersensitive become calm and lose their irritability, and the dull and apathetic are stimulated. The physiological evidence clearly points to this effect, but the explanation has yet to be learned. Smoking, however, leads to digestive and circulatory disturbances. There is an increasing impression amongst clinicians that the insidious action of nicotine spread over many years of continuous absorption is responsible for at least some of the cardio-vascular diseases so common in middle and later life.

It may be argued that if nicotine adds to the agreeableness of life, why not use a path so pleasant? In persons of vivid sensations, to calm the commotion of conflicting sensations may be beneficial, even to the higher faculties; in the dull and listless to stimulate thought must be beneficial. It may well be that living in a civilization such as ours, under the conditions of strain imposed by residence in cities, the ordinary man shows in his nervous responses variations from the normal, and on such tobacco exerts a beneficial function. To what extent strict moderation in the use of tobacco leads to vascular degeneration is uncertain; is it the rule or the exception? This is the vital question to which we require an answer, and upon this answer something of the well-being of the nation depends.

In conclusion I venture to suggest that the collective sagacity of this society, and that of the medical profession as a whole, could occupy itself with no subject more important to the nation than that of tobacco smoking.

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X RAYS IN THE DIAGNOSIS OF INTRATHORACIC GROWTHS.*

BY

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(*With Special Plate.*)

In the pre-radiological days there were but few publications and very few discussions on intrathoracic neoplasms. Such references as there were dealt with the matter only from the standpoint of morbid anatomy. Out of 174 cases reported in 1904 by Sehrt, in six only had a correct clinical diagnosis been made. It is certainly less than a hundred years since neoplastic diseases of the chest were first subjected to any systematic examination, and less than thirty years since any such examination was possible *in vivo* by means of *x* rays. In 1810 Bayle, a favourite physician of Napoleon, in his *Recherches sur la Phthise Pulmonaire*, coined the term "phthise cancéreuse," showing that even at that time morbid anatomy was not unaware of the relationship between the two diseases. The symptom-complex of increased intrathoracic pressure was pointed out by Bell of Glasgow and by Stokes of Dublin, but this was as far as our forebears would go in the way of clinical diagnosis. Nor is this attitude to be wondered at; in the first place, intrathoracic new growths were regarded as being of extremely rare occurrence, and, in the second place, the hopelessness of the prognosis was not conducive to any great enthusiasm.

It is customary to divide intrathoracic new growths into two classes: (*a*) benign, and (*b*) malignant. But it is only in the pathological sense that this distinction can be drawn, for every intrathoracic new growth, however benign in its pathology, will in time deprive the patient of life by a process of pressure. It seems well to appreciate this point, if for no other reason than that clinician and radiologist may be alive to the vital necessity for early diagnosis. Unfortunately, even true malignant neoplasms, as a rule, give so little evidence of their presence until they have grown to such a size as to cause pressure symptoms, or increasing breathlessness. Am I wrong in suggesting that on the very first evidence of even occasional breathlessness that cannot be accounted for the aid of the radiologist should be asked? It is said that the day is approaching when every clinician will be so alive to the interpretation of a skiagraph that the radiologist will no longer be asked to carry out his proper function. I shall not live to see that day, but I am sufficiently optimistic to feel that it will be many a long day before such a complete revolution takes place, and that the wiser the clinician, the more will he demand all the expert assistance possible in arriving at a diagnosis.

Benign Neoplasms.

These are for the most part extrapulmonary.

Fibroma.

The *x*-ray evidence is that of a well defined, more or less rounded opacity, which can be shown to arise from the posterior wall of the thorax, pushing in front of itself the lung and not directly invading it. Owing to the non-irritant nature of the structure of the fibromata, there is seldom any pleural adhesion, the lung surrounding the growth but able to be separated readily. Any further growth of the tumour tends to depress the diaphragm, push the heart and mediastinum to the opposite side, and to cause compression of the adjacent lung tissue.

Diagnosis is rendered easy by the simple expedient of collapsing the lung by the production of artificial pneumothorax, when the evidence of an isolated and free tumour, which is extrapulmonary, can be made out. This expedient of compressing the lung by the admission of air into the pleural cavity has not been utilized as much as it

* The opening paper in a discussion on this subject in the Section of Radiology at the Annual Meeting of the British Medical Association in Edinburgh, July, 1927.

might have been. In this country and in France it is of daily usefulness; in Germany it does not appear to have received the attention it deserves, and I venture to suggest that as a consequence many cases of fibroma have been mistaken for fibro-sarcomata, thus erroneously increasing the number of cases of primary sarcoma of the lung.

Teratomata.

Teratomata, or congenital inclusion cysts, may occur anywhere. In the thorax the most common (though the total number is not very great) are of the type of dermoid cysts, which are epiblastic in origin and contain any of the constituents of skin (hair, sebaceous material, teeth). They grow from the third branchial cleft or from the remains of the thymus gland, and are in consequence anterior in position, differing thereby from the fibromata which practically invariably grow from the posterior ends of ribs. By a curious chance we have seen no fewer than five of these cysts at Brompton Hospital in the last twelve months, so we feel ourselves in the position of authorities on the subject (nowadays one can assume authority on such slender basis).

The dermoid cyst differs from the fibroma in being more irritant; consequently, it not only pushes the lung in front of itself, but is apt to set up adhesions between itself and the pleura, making it more difficult, if not impossible, to shell it out easily from the enveloping lung.

The diagnosis of a fairly well defined, though often markedly irregular, tumour is readily made by examining in the dead lateral plane—a matter of ease nowadays, but one upon which the differential diagnosis depends. In the films which I show it will be noticed that the tumour lies close to the sternum and nearer the front than the back of the chest, when viewed in the lateral plane.

It is unfortunate that the early clinical diagnosis in intrathoracic new growths is indefinite and even misleading. In one of our cases of dermoid cyst the only clinical evidence was that of a sudden and somewhat severe haemoptysis; indeed, the occurrence of haemoptysis is not infrequently the sole clinical evidence, though it does nothing to assist the diagnosis as to the nature of the tumour. This is a pity, for, having regard to the positive fact that a fatal termination has to be anticipated, it follows that if surgery is to be of use the earlier the diagnosis is made the smaller the tumour and the better the outlook.

Malignant Neoplasms.

1. *Primary Carcinoma.*

In another place I asked the opinion of my colleagues as to their experience regarding the apparent increase in the number of cases of primary lung cancer. In my own work I had to admit that this increase must be real. Nor is this contention without support, and in the following table you will see that primary lung cancer is placed, according to various observers in Germany, as high as about 4 per cent. of all carcinomata found in the body.

Statistics of Pulmonary Carcinoma.

Goldstein.		
1886.	Fuchs	1.27
1896.	Passler	1.85
1897.	Perutz	1.27
1901.	Feilchenfeld	4.3
1902.	Reichelman	3.8
1907.	Otten	3.3
	Redlich	6.3
1913.	Mielecki	3.5
1914.	Brinckmann	5.6
1919.	Bejach	4.8
1920.	Briese	4.5
Schmoller.		
1924.	Bejach	6.3
	Brinckmann	5.6
1907-11.	Kolszewski (Berlin)	6.0

Fortschritte f. R., January, 1924.

"The figures represent the percentage of primary lung carcinoma relative to primary carcinoma of all other organs. The years correspond to the year in which the statistics were compiled and the name of the compiler. Reckoning from the *post-mortem* statistics a similar increase appears to have occurred in the total number of lung carcinomas. According to the comprehensive statistics from Kraus-Brugsch, primary lung carcinoma is four times as common as primary lung sarcoma."—*Fortschritte f. R.*, March, 1924.

The question to which I would invite discussion is as follows: Is this increase real, or can it be that many cases which we now recognize as carcinoma have in the past been mistaken for pulmonary tuberculosis, and especially of the fibroid type? There is some trustworthy proof of this. Friedländer and others have found squamous-celled carcinoma in the walls of an old tuberculous cavity. The experienced chest clinician, and radiologist too, knows that tuberculous infiltration may accompany neoplastic disease. Following irritative conditions, as, for instance, in the cobalt miners of Schneeberg, the subjects of chronic interstitial pneumonia and pneumonoconiosis, primary lung carcinoma is not uncommon. This possibly helps to appreciate the German figures.

Almost without exception new growths of the lung have an acute history to start with, or set up acute bronchial conditions. Primary cancer of the lung usually starts in the mucous membrane of a large bronchus close to the bifurcation of the trachea. A malignant growth may be of quite large size before it gives any positive evidence of its presence. As it grows outwards it tends to compress the lung above itself, the limit of the neoplasm and the adjacent lung tissue being difficult to make out; the growth at first is strictly delimited by the interlobar fissure. From the situation of the growth it will be appreciated that the earliest clinical evidence is that of bronchial stenosis and the presence of "silent" lung above the growth. There is a definite tendency for the heart and mediastinum to be drawn towards the affected side, and this is a diagnostic feature of no little importance. Involvement of the phrenic nerve frequently follows, the diaphragm being raised and finally paralysed. A primary carcinoma in the upper part of the chest is more readily recognized than when the lower zone is the seat of the trouble. The density of the mass and its sharp delimitation by the interlobar fissure can only be confused with a massive lobar pneumonia, in which, however, the history will assist. In the lower zone, however, there is much more rapid pleural involvement, the growth is less sharply defined, and the occurrence of secondary degenerative changes are much more rapidly met with. In all cases pleural involvement and degenerative changes, simulating breaking down and abscess formation, tend to make the distinction between cancer and other inflammatory affections more difficult. The degenerative processes are by themselves impossible to distinguish from those of gangrene or bronchiectasis.

2. *Sarcoma.*

I am anxious to learn whether primary sarcoma of the lung (as opposed to lymphosarcoma arising from the mediastinal glands and therefore primarily mediastinal) does really exist. Adler critically examined ninety cases, and came to the conclusion that hardly any of them appeared to justify their separation from carcinoma. A metastasis from some undiscovered primary focus (for example, the prostate) may well account for some of the suggested primary lung sarcomas.

Hodgkin's Disease.

The diagnosis of this disease is not, as a rule, difficult, for it is but seldom that glandular enlargements are met with only in the mediastinum. The blood picture is not of great assistance, but moderate eosinophilia, progressive anaemia, with increase in the leucocytes, and frequently pyrexia, are all helpful in the diagnosis. The *x*-ray picture is that of a fairly well defined mass in the mediastinum, simulating any other mediastinal growth.

New Growths of the Mediastinum.

Surely the most difficult part of our work is the differential diagnosis between the various tumours which may be encountered in the mediastinum. Some years ago the best and kindest thing that could be said of the radiology of the chest was that it was of great value in the diagnosis between aneurysm and new growth, and that the diagnosis was simple. All one had to do was to place the patient in front of a fluorescent screen and the diagnosis leapt out! How delightful if this were so! But I am speaking to learned and experienced radiologists, and you will agree with me that the matter is not quite so simple

as it seems. How often have not we had to wait in order to decide whether a large pulsating tumour in the mediastinum would turn out to be a large aneurysm of the arch or a sarcoma growing from the mediastinum? And mind you, not infrequently the matter was further complicated by there being a positive Wassermann reaction. Nor does the clinical examination assist us. Most of the signs are alike in both, and these are due chiefly to pressure effects. Cyanosis, venous engorgement, and signs of collateral circulation are possibly more common in neoplasm. The time factor is of service; if signs have persisted for eighteen months or thereabouts, the evidence is in favour of aneurysm.

Hare, in an excellent analysis of 520 cases of mediastinal disease, gives the following table:

Cancer	134
Sarcoma	90
Lymphoma	21
Dermoid	11
Hydatid	8

The rest were composed of inflammatory disease, and included instances of lipoma, enchondroma, and gumma.

There are three tumours in the mediastinum which I should especially like to mention: (1) Aneurysm of the thoracic aorta (arch). (2) Sarcoma growing either from the mediastinum glands, or (as in a case under my care) as arising from the remains of the thymus gland. (3) Malignant tumour growing from the thyroid.

(1) *Aneurysm of the Aortic Arch.*—I need not labour the question of diagnosis in this condition. It is obvious that the history must be taken into account, the absence or presence of a positive Wassermann reaction noted, and examination in the lateral oblique as well as in the postero-anterior plane, the former showing marked tendency to "clubbing," and thereby differentiating it from anything else.

(2) *Sarcoma of the Mediastinum.*—In this condition there is often a pulsation (transmitted) equal to, if not greater than, that in the case of a large and consolidated aneursym. To decide whether pulsation is transmitted or not is truly a difficult matter. A large mediastinal sarcoma frequently invades both sides of the mediastinal space, causing compression or deviation of the trachea, definite signs of compression, interference with the circulation, etc. Differing from aneurysm, it seldom causes erosion of the bony structures; indeed, the diagnosis of aneurysm is frequently determined by this result.

(3) *Tumour Growing from the Thyroid.*—Examination in the lateral plane will reveal a tongue-like process growing downwards and forwards and depressing the arch of the aorta. Such growths are of extreme rarity, but the foregoing evidence clearly demonstrates the situation of the growth.

At the conclusion of his paper, Dr. Stanley Melville put forward the following three questions for discussion:

> Is it held that there is any definite association between primary carcinoma and pulmonary tuberculosis?
>
> What is the opinion of the Section on the rather vital question of the increase of malignant disease? Is this real, or are we now beginning to diagnose tumours of the lung which in pre-radiological days were regarded as pulmonary tuberculosis, and especially of the fibrotic type?
>
> What evidence is there of definite primary sarcoma of the lung?

DISCUSSION.

Mr. C. THURSTAN HOLLAND (Liverpool) said that too much was expected from radiology as regards the differential diagnosis of conditions of the chest. It was easy to demonstrate various growths in the chest by radiography, but differential diagnosis was extremely difficult, and in some cases impossible. In the attempt to distinguish between aneurysm and growth mistakes had often been made both ways. In doubtful cases he ascertained whether in any position of the patient wave-like pulsations could be seen on the edge of the shadow; if such were present he reported that it was a case of pulmonary aneurysm, but it did not follow when these were not seen that there was no aneurysm there. It might not be possible to get the patient into such a position that the wave-like pulsation was visible, or there might not be any wave-like pulsation. With regard to the first of Dr. Melville's three questions, Dr. Thurstan Holland had never seen anything either in the *x*-ray department or in the *post-mortem* room which would have led him to believe that there was any direct connexion between pulmonary tuberculosis and primary carcinoma, nor that malignant disease of the lung was increasing. It was much more likely that accuracy in diagnosis had improved, so that more cases had been collected, and thus the increase was apparent rather than real. He did not think he had ever seen a case of primary sarcoma of the lung, though he had seen secondary sarcoma many times. He agreed with Dr. Melville about differential diagnosis, but one or two points had not been mentioned—for example, the drawing off of fluid in the chest, which had often obscured a growth. Certain American workers had recently stated that, by giving doubtful cases a definite dose of *x* rays and taking radiographs under standard conditions, as a result of the action of the rays on the presumed growth they had often been able to make a differential diagnosis, and had frequently obtained valuable information. There were a large number of intrathoracic cases of the kind not diagnosable by *x* rays alone. Only by the collaboration of the clinician and the radiologist, and only when the greatest care was taken, was accurate differential diagnosis possible.

Dr. A. E. BARCLAY (Manchester) emphasized the absolute need of co-operation between the clinical side of medicine and the radiologist. The radiologist who worked merely in his own department would make mistakes, and, on the other hand, much clinical medicine should be rewritten nowadays in the light of radiology. He asked whether anyone present had demonstrated tracheal tugging in the case of an aneurysm.

Dr. D. CAMPBELL SUTTIE (Glasgow) said that as a radiologist at a children's hospital his experience, gained in dealing with perhaps 14,000 chest cases in children up to the age of 12, was that primary tumours of the chest were very rare; he had seen only one case of secondary tumour.

Dr. L. A. ROWDEN (Leeds), speaking of the diagnosis of chest tumours, said that radiologists in his part of the country always gave an opaque feed to see what effect the growth had upon the oesophagus. The method was very helpful in certain cases.

Sir HUMPHRY ROLLESTON (Cambridge) agreed that it was important that the clinician should go into the radiological department and the radiologist into the *post-mortem* room. With regard to tracheal tugging, he had always had a doubt as to whether he was applying the test in the proper way, and he believed that the difficulty was not so much in saying whether there was tracheal tugging as in deciding whether it was due to an aneurysm, or to mediastinitis, or to a mediastinal tumour.

Lord DAWSON OF PENN suggested that it would be worth while trying conjoint teaching. When there were clinical lectures in the wards the radiologist might be invited to come to discuss the matter from his own point of view. The radiologist was, however, apt to think that an audience in front of him was a meeting of radiologists, and he did not always sufficiently realize that clinical teaching had to be short and succinct so as to allow five or six cases to be dealt with in two hours. The difficulty would disappear with more frequent co-ordination, which would benefit both clinicians and radiologists, each being able to see the difficulties of the other. Tracheal tugging existed, but no one would be so foolish as to diagnose an aneurysm by this alone, since aneurysms often occurred without it. The advances of radiology were greater than those of almost all other branches of medicine, but the great difficulty was the expense. Unless a picture was extremely good the clinician was apt to be misled. He had found it very difficult sometimes even to tell an advanced case of tuberculosis from certain types of growth.

Dr. N. S. Finzi (London) said that it was very difficult sometimes to decide whether a sarcoma started in the mediastinum or in the lung, whether it had involved the lung and spread into the mediastinum, or vice versa. One case he had encountered was very definite because the growth was in the apex of the lung. On other occasions he had felt almost certain that the primary growth was in the lung and had spread into the mediastinum and involved the walls of the aorta. He had seen at a necropsy a case in which the walls of the aorta and of the oesophagus were involved, and it was very difficult to prove that the condition did not start in the mediastinum.

The President (Dr. Woodburn Morison) said that radiology was a definite part of clinical examination—an extension of the method of inspection; he would like to see it mentioned in all textbooks under the head of "physical examination for clinical diagnosis." The radiologist was rarely a clinician, and the clinician was only occasionally a radiologist. The ideal would be for the clinician to be an expert radiologist, but until that time came, and until the clinician would willingly undergo the labour of acquiring a knowledge of radiology, the only course was co-operation. The term "radiological diagnosis" was often used and seldom justifiable.

Dr. Melville, in reply, doubted whether his questions had been answered. Dr. Finzi was the only speaker to tackle the question of the site of origin of a sarcoma, and his conclusions were disappointing—merely that the sarcoma might have started in the mediastinum. So much was heard of primary sarcomas of the lung, and yet hardly anyone in that meeting could say definitely that he had seen such a thing. It was quite conceivable that a small focus in the prostate or ovary might have been overlooked, and metastases in the lung, which would be more evident, had occurred. True primary sarcoma of the lung was, he maintained, to use a Scottish term, "not proven."

X RAYS AND RADIUM IN THE TREATMENT OF CARCINOMA OF THE BREAST.*

BY

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(*With Special Plate.*)

Certain considerations, as to the natural history and spread of cancer of the breast, influence so largely the question of treatment that we must spare a few moments to discuss them.

With the rarest exceptions, medical men are agreed that cancer starts as a local disease, or at any rate a local manifestation. In most types of the disease it tends sooner or later to spread—at first by the lymphatics and lymphatic glands, and later, in some cases, by the blood stream. If the disease is *completely* removed while it is still local, whether by surgery or by radiations, the patient will be cured. When, however, the disease has spread beyond the area removed, or beyond the area to which a sufficiency of radiations has been given, it recommences to grow, and tends subsequently to kill the patient. In rare cases, in old people, the disease remains localized, and shows no tendency to any distant spread.

In an occasional case, of the most extraordinary rarity, the disease, though well advanced, may completely disappear, perhaps for a time only. I have seen two such cases in the course of many years, during which I have seen thousands of breast carcinomas. One of these cases was shown at a society, and the other occurred in my practice at St. Bartholomew's Hospital. We have reason to fear that, after being well for more than two and a half years, the latter is beginning to recur.

Obviously the mode and directions of spread are extremely important, and we must therefore carefully consider the lymphatic supply of the breast. It must be remembered that the disease can pass either with or against the direction of lymphatic flow, and it has been shown by Sampson Handley that cancer cells may die out in one part of a lymphatic and cause it to shrink down to a fibrous thread, while further on, in the same lymphatic, they may develop into a tumour. The fact that cancer cells can be traced along the lymphatic channels seems to show that it is the cells themselves which spread the disease, for the cells of normal tissues do not appear to enter the lymphatics.

The lymphatics from the mamma pass mainly into the pectoral group of axillary glands, and occasionally directly to the subclavicular glands. Lymphatic cells also pass from the inner part of the mamma into the intercostal spaces and so into the sternal lymph glands. Lymphatic vessels from the upper part of the pectoral region also pass directly to the supraclavicular glands. The lymphatics from the pectoral group pass to the rest of the axillary glands, the subclavicular glands, and the supraclavicular glands, and thence to the glands in the posterior mediastinum. Those from the sternal glands pass into the anterior mediastinum and thence into the posterior mediastinum. The lymphatics on the surface of the upper abdomen are also connected with the pectoral lymphatics.

Thus it will be observed that, when the primary growth is in the outer part of the breast, further trouble may be first expected in the axillary and the subclavicular glands, and later in the supraclavicular glands and the posterior mediastinum. If it is in the inner part of the breast, the inner end of the intercostal spaces and the anterior mediastinum are the danger zones. If in the upper part of the breast the supraclavicular glands must be suspected. In practice a recurrence under the costo-coracoid ligament, very difficult to feel but causing much swelling of the arm and forearm, is very common; probably almost all, if not quite all, the cases of great lymphatic obstruction in the arm after carcinoma of the breast are due to this cause. In advanced cases the disease often invades the pleura, possibly by the sternal glands or the intercostal glands, possibly by way of the mediastinum. It is obvious that the cells will eventually reach the blood stream by the thoracic duct.

Involvement of the mediastinal and tracheo-bronchial glands may often be discovered by a skiagram, as also pleural metastases and blood-disseminated metastases in the lungs: they obviously cannot be seen in the earliest stages, but only when they have formed definite tumours. They tend to have a typical rounded appearance. For this reason, and also for future reference, skiagrams, both anterior and antero-lateral, should be taken of every breast carcinoma before *x*-ray treatment.

Action of Radium Rays and *X* Rays in Carcinoma.

The alpha and the beta rays of radium need only be considered shortly. The former have, as their low penetrating power would indicate, apparently no value in the treatment of carcinoma of the breast. With beta rays the matter is not so definite, but anyhow much better results have been obtained by gamma rays and by *x* rays in this disease, so that I shall not deal with the beta rays in this paper.

In vitro it is found that there is a certain minimal dose which, when applied to experimental growths, will inevitably prevent their development. This is the "lethal dose," and will cause the growth to be absorbed by the tissues of the animal into which it is implanted, and it will then immunize this animal against future implants of a similar growth. Larger doses of rays will equally prevent development of the irradiated graft, but will not immunize to the same extent, so that, when about twenty times the lethal dose has been given, the graft no longer immunizes. Doses smaller than the lethal dose will reduce the ratio of successful implantations without preventing them in every case. The lethal dose is much higher than can be applied to living tissues without causing their necrosis.

The irradiation of the tissues into which a cancer graft is to be made will reduce the percentage of successful takes compared with controls. When the tissues and growth are irradiated together the latter will disappear with a dose of the order of half the lethal dose.

* The opening paper of a discussion in the Section of Radiology at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

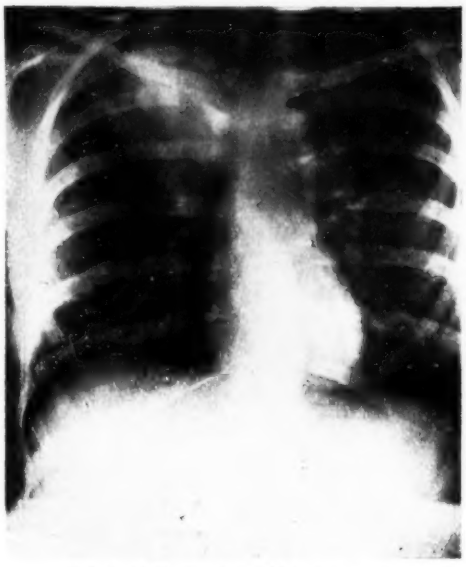

FIG. 1.—Primary bronchial carcinoma.

FIG. 2.—Primary bronchial carcinoma. Note paralysed diaphragm on affected side.

FIG. 3.—Primary carcinoma (same case, after injection of lipiodol and production of artificial pneumothorax) showing stenosis of bronchus.

FIG. 4.—Miliary carcinoma of lung. Secondary to a primary focus in ovary.

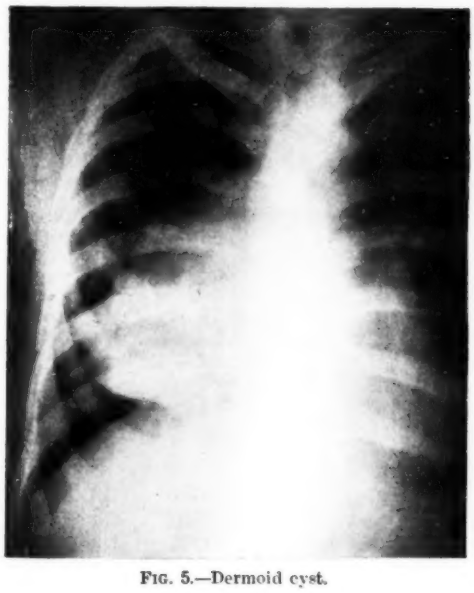

FIG. 5.—Dermoid cyst.

FIG. 6.—Dermoid cyst. (Same case in lateral plane.)

FIG. 1.—Acute burn. Before treatment.

FIG. 2.—Acute burn. Three weeks after treatment.

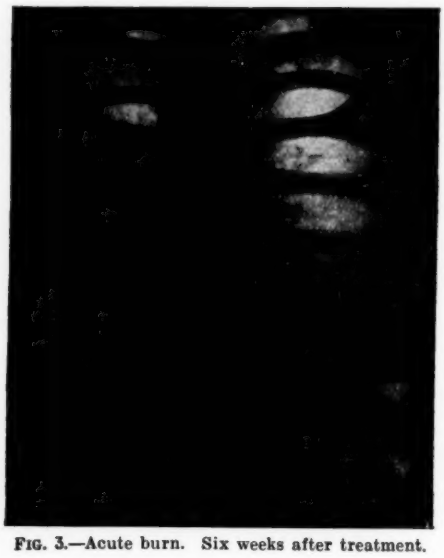

FIG. 3.—Acute burn. Six weeks after treatment.

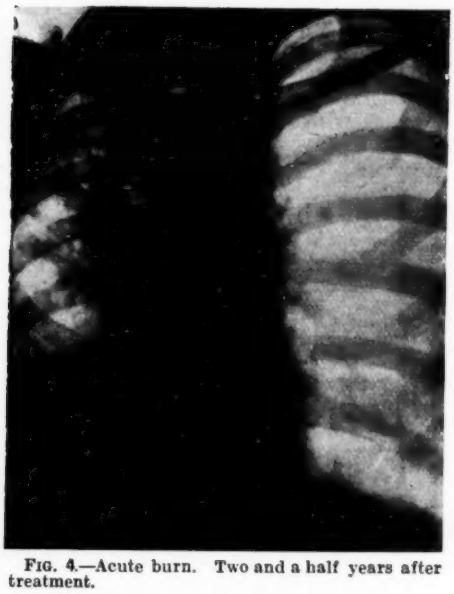

FIG. 4.—Acute burn. Two and a half years after treatment.

FIG. 5.—Chronic burn. Three months after termination of six months' treatment.

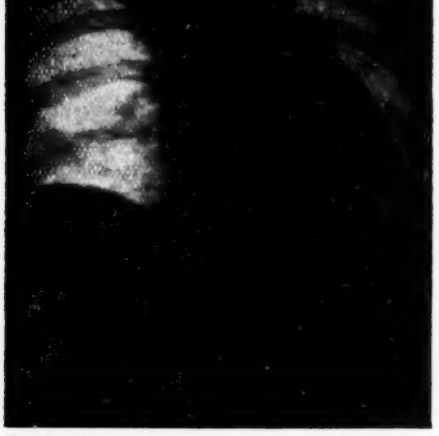

FIG. 6.—Chronic burn. Same case, two years later.

The action of the rays in a human being varies with the type of disease. In general the more rapidly growing the neoplasm the more readily will it succumb to irradiation; but, as the rapidly growing forms spread more quickly, a wider area and more distant glands will need to be treated in such cases, and a greater number of successful results will subsequently be spoilt by distant metastases. With the rapidly growing forms the effect of the rays is rapid, a change being seen in a day or two, while in the more slowly growing forms the changes may take a good many weeks.

The type of ray used also has an influence on the type of reaction. As the wave-length of *x* rays decreases, so their effect takes longer and longer to appear. With gamma rays, however, the effect appears in about the same time as *x* rays produced by 150 kilovolts continuous current. I am distinctly of opinion that the carcinomata and epitheliomata respond better to *x* rays, the shorter the wave-length, if full doses are given. Consequently the radium gamma rays are the best, provided that they are applied in sufficient quantity. With some types of sarcoma it is probably a different story. The lymphosarcoma probably responds at least as well to medium wave-lengths if applied in sufficient concentration.

Comparison of Radium Gamma Rays and X Rays.

With modern apparatus *x* rays can be obtained in large quantities to rival which we should have to use what we at present regard as enormous quantities of radium. On the other hand, this can to a certain extent be counteracted by the facility with which the radium can be applied for prolonged periods, even continuously for many days. In the rare instances in which comparatively large quantities of radium can be secured and they are used in a similar way to *x* rays, they are not concentrated into a point focus, but spread over a large radiating surface, with the result that the relative depth dose is greatly increased. Much more commonly the radium is used considerably nearer the surface than an *x*-ray focus can possibly be placed, but spread over a large area. It is left in place usually for a number of days or even weeks.

The radium rays are much more penetrating, and, for the same amount of damage to healthy tissues, seem to exert more effect on carcinomata than *x* rays. However, with radium used in this way, the underlying lung must get a large dose and subsequent lung damage may be expected. With *x* rays, on the other hand, the use of a glancing method (subsequently described) will to a large extent prevent this.

Radium used for external applications, therefore, has the advantages, compared with *x* rays, of more penetrating rays of a more suitable wave-length, multiple foci or a series of large foci, and continuous application. Its disadvantages are that it is not so easy to give an even dose over the large deep area required in breast carcinoma, and that it is not possible to avoid injury to the lung.

Radium is used also in quite another way—namely, by burying a number of radium containers in the tissues. As a rule hollow needles containing either radium salt or radon are employed. When small quantities are used in each needle for a week or more the radon is at a very decided disadvantage compared to the salt, for, in order to obtain the same total dose, a considerably larger amount of radon has to be used at the start and the effects are different. The needles are used deep to the growth if possible, or in its deeper layers, not in the middle of it. The gland areas are, of course, needled at the same time. *X* rays are not used in any way comparable to this.

I have an impression that the results with buried radium are better than with external methods, *provided that the wounds remain aseptic*. This can only be accomplished by meticulous care, owing to the damage inflicted by the radium on the tissues. I have advanced in explanation the hypothesis that around the radium needles there are zones in which the cells of the growth receive a true "lethal" dose, and that the absorption of these may weaken the resistance of the remaining cells to smaller doses of rays.

TREATMENT BY IRRADIATION ALONE.

1. *Primary Growth Localized in Breast: no Palpable Glands.*

(*a*) *Operable* (as far as local condition is concerned).—Should we treat an operable case with radiations when surgery is not contraindicated? The answer is: At present, only if the breast is subsequently removed. The loss of time, possibly two months, is probably more than compensated for by the diminished likelihood of insemination of the growth at the operation. So far we have treated very few truly operable cases either with radium or *x* rays, and we have not yet had the breast removed after complete disappearance of the growth and so proved the absence of cancer cells.* Therefore we cannot say that our technique is yet good enough to recommend the treatment of the disease by irradiation alone when it is operable. When other causes contraindicate operation the case must be considered as inoperable and treated as such.

(*b*) *Inoperable.*—We have succeeded in a number of cases in rendering the growth inactive for long periods by *x* rays, but we have seldom observed its complete disappearance. With radium needling, properly done, our results are more encouraging. In a large proportion the growth completely disappears, and the only questions then are whether all the cells have disappeared, whether the gland areas have received a large enough dose, and whether the mediastinum is also involved.

2. *Primary Growth in Breast: Palpable Glands in Axilla.*

The radiation treatment of such a case depends largely on the skiagraphic evidence. If the typical rounded mediastinal glands are seen, nothing but mediastinal treatment is of any value, and as this usually prevents a sufficient dose being given to the breast and axilla, the question of surgical help must be considered. If the mediastinum is not demonstrably involved, it is best to assume for the time being that it is free and treat the breast just as if operable, with the exceptions that the subclavicular and probably also the supraclavicular regions must be treated, and, if the growth is in the inner part of the breast, the inner ends of the intercostal spaces also. If the mediastinum is subsequently found to be involved, it can then be treated by *x* rays.

3. *Primary Growth with Supraclavicular Deposits on the Same Side.*

Such cases must always be regarded as having the mediastinum affected, even when too early to show with *x* rays, and unless mediastinal treatment can be adopted together with correct dosage of the breast, axilla, and supraclavicular regions with *x* rays, no permanent success can be hoped for. Combined radium and *x*-ray treatment might be used in some of these cases.

4. *With Definite Mediastinal Involvement.*

Until comparatively recently I regarded these cases as almost hopeless and attempted nothing radical. I have, however, had several cases which have done so extraordinarily well that I no longer despair. It is now more than three years since I treated the first by my present technique and the patient is still well. Another has been under treatment over two and a half years and has had very extensive recurrences, but has recovered in a miraculous way.

5. *Treatment of Distant Metastases.*

Bone metastases are usually very painful, and there may for a time be only one or two. Treatment of such metastases gives so much relief that it cannot be refused, even though it is certain that the patient will ultimately succumb to other metastases. Even when the pelvic bones are riddled with disease I have observed much relief from radical treatment, lasting often for six months or more. There are, of course, limits, and generalized disease, masses in the liver, and so on, should not be treated by irradiation.

* This has now been done (October, 1927).

RECURRENCES AFTER OPERATION.

Local.—The general lines of treatment of these will be similar to the methods of dealing with a primary growth detailed already.

Distant.—In the axilla, the coracoid region, and in the mediastinum, the treatment will be as when the primary growth is present. Metastases in distant parts must be dealt with on their merits; they are worth treating on account of the great relief from pain and disability, though when once there are deposits in distant bones there is no hope of ultimate cure. In that bane of us all, the recurrence in the sacrum, pelvic bones, and lumbar spine, complete relief of pain can often be given for many months, and I have seen a patient live for three years after a recurrence in the lower end of the femur had been cured by *x*-ray treatment.

TREATMENT BY RADIATION COMBINED WITH SURGERY.

There are many problems to be discussed under this heading.

1. *Radical Operation Preceded or Followed by Irradiation.*

Surgery has had so long an innings, and the procedure has become so standardized, that the statistics should be fairly definite. There are, however, only few figures giving five-year results, and these seem to vary considerably. With radiation used in addition, it is extremely difficult to determine the results. To start with, the procedure is not standardized; consequently if it is any good at all, obviously the best method will give the best results. It is my personal belief that thorough irradiation improves the results, but that small and ineffective dosage hastens the appearance of recurrence, though it probably cannot induce it. One great difficulty in treating these patients is the mental attitude. The surgeon may make the patient believe that it is necessary to do a big operation to remove a "harmless little growth" or "an inflammatory focus," but this leaves the radiologist little chance of explaining that radium or *x* rays, with all their attendant expense, must be used to diminish the possibility of its return, especially if radical methods are used.

The Erlangen school holds that irradiation after a radical operation is of no value owing to the disturbance of the blood supply; but the rarity of local recurrence in treated cases, compared with its comparative frequency in untreated cases, leads to the belief that the treatment is beneficial.

The prophylactic use of *x* rays may be either pre-operative or post-operative.

(*a*) *Pre-operative.*—The basis of this treatment is that the rays will damage the carcinoma cells and so prevent their development if any are scattered in the wound. The use of large doses, however, may prevent the wound from healing, especially if there is much tension on it, and there may result either sloughing or complete failure of the cut edges to unite. Having had two cases in which one of these events occurred, I have not dared to employ it again, though the principle seems sound. The use of small doses to stimulate the defence mechanism is a very questionable proceeding.

(*b*) *Post-operative.*—Radium can be used either in some form of moulded apparatus or in the form of plaques. It is advisable that there should be a space between the radium and the skin in order to get even irradiation at the deeper levels. It is doubtful, however, if the axilla will get so effective a dose as with *x* rays, and it is not possible to protect the lung. *X* rays are applied to the pectoral area by a glancing method, and to the supraclavicular and coracoid regions from the front and back. I prefer to separate the two treatments by an interval of three months so that the axilla is treated twice, the first area being that in which recurrence is the more likely from the original position of the growth.

As to dosage in prophylactic treatment, I hold very strongly the view that the methods used should be exactly the same as when a demonstrable recurrence is present, and the doses just as full. We assume that there still remains some disease and use the most thorough methods to eradicate it. It has lately become the custom in Germany to split the dose into smaller treatments at long intervals. This is based on the following theory: Experiments with beans have shown that there is a certain minimal dose which will kill a growing bean. If one-third of this dose is applied and repeated on two subsequent occasions at some weeks' interval, the bean grows normally. Now, if a resting (dry) bean be treated in the same way with three fractional doses it will fail to develop. It is assumed that the cancer cells in a prophylactic treatment are in a similar resting stage and that they can be killed by summated doses without harming the remainder of the tissues. I disbelieve this theory because I think it is wrong to consider the cancer cells as in the same state as the resting bean.

A quite different method of prophylactic treatment is the leaving, during the operation, of small radium tubes in places where recurrences are most likely to take place, or rather, in the lymphatic path along which the cells are most likely to spread. The placing of the radium tubes will depend upon the position of the primary growth. They are most usually placed in the supraclavicular and the subclavicular regions, and in the muscles at the inner ends of the upper three or four intercostal spaces. My only criticism of this method is that its zone of action is limited, and, to get at all a large dose, it is necessary to give too much in the immediate neighbourhood of the radium.

2. *Local Removal of the Growth and Irradiation.*

My view on this is that, if we can get rid of the deposits in the axillary glands, it is almost certain that we can also get rid of the primary growth, and its surgical removal is therefore an unnecessary disturbance. When the mediastinum is involved, however, it may facilitate the technique to remove the breast without doing an extensive dissection. It is best done after the radiation treatment to diminish the likelihood of insemination. Each of such cases should be carefuly considered by the surgeon and radiologist in consultation. Local removal may also be performed in cases apparently cured by radium or *x*-ray treatment, in order to be sure that the technique is good enough to cause all the carcinoma cells to be absorbed, but if once this fact is established it will no longer be necessary.

3. *Exposure of the Growth, Irradiation, Closure.*

This method has been proposed to get over the difficulty of the dose of medium *x* rays being limited by the sensitiveness of the skin. I have no experience of the use of *x* rays or radium in this way; radium buried in the tissues will be considered separately. Similarly the open wound might be treated after a radical operation, but anything like a full irradiation would probably prevent proper healing.

4. *Radium Surgery of Access.*

The technique for the introduction of the needles in a breast case is not simple and considerable practice is needed to get satisfatory results. Only a study of the skiagrams of his cases will enable a surgeon to realize how different is the position of the needles from what he had imagined. The supreme importance of asepsis cannot be too greatly emphasized, and it is no ordinary asepsis that is needed. Normally the tissues can deal with quite a large number of bacteria, but they are rendered much more vulnerable to bacterial attack after being exposed to radium rays in the large doses required. Therefore far greater precautions must be taken than with healthy tissues—as much care as is necessary to keep the tissues of a diabetic free from sepsis in an operation.

The treatment of recurrences by radium needling is only sound when the recurrence is absolutely local. Multiple recurrences are generally evidence either of some deeper focus or of extensive superficial invasion, and need to be treated accordingly.

AFTER-EFFECTS OF RADIATION.

Immediate.

Some patients suffer from sickness, which may be considerable if the dose is large. This can be much diminished or even abolished by certain precautions. In the first

place, spreading the treatment over several days is very effective. Next the avoidance of direct radiation passing through the chest helps a great deal when it is feasible. Then, having well ventilated treatment rooms, from which all corona discharge is eliminated, also assists considerably. The administration of 10 grains of chloretone before the treatment, and three times a day during it, is also of assistance. Lastly, the patient should be advised to drink plenty and to eat very little during the course of treatment. When the treatment is divided, the amount of radiation must be increased.

Subsequent.

A certain amount of erythema of the skin must be obtained if the results are to be successful, and this should be just short of vesication. If the treatment is repeated, telangiectases may be expected to form a year or two afterwards, and, if several times repeated in full doses, they are inevitable.

When the skin is much changed by several treatments it is very susceptible to damage by any trauma—even a very hot bath will do it—and to infections when so damaged. These infections cause a very intractable ulceration, and the best treatment is to get them in the early stages, cultivate the infective agent, and then give the patient vaccines from this. Zinc ionization is also useful in healing the ulcerations.

When effective doses of rays are used on the chest wall, it is difficult to avoid the lung receiving such doses. Many such cases will then develop a characteristic lesion of the lungs. It does not occur in all cases unless the dose has been very large, and it may be due to the waking up of old disease foci which exist in most lungs. The acute form is produced by a large dose of radiation delivered over a few days, and shows itself first of all as a pneumonic patch in the lung with slight displacement of the heart and mediastinal contents towards the affected region. This displacement gradually becomes more marked and eventually typical mottlings appear in the affected lung. Later the typical appearance of bronchiectasis develops, generally, however, without the symptoms of this condition. (Figs. 1, 2, 3, 4.) In the chronic form, caused by irradiation at intervals over a long period, the changes are similar except that the pneumonic stage is not observed. In the final stage the patient is unconscious of any abnormality as a rule, but in one acute case a typical bronchietasis remained. (Figs. 5, 6.)

TECHNIQUE.

X Rays.

In order to avoid the lung damage referred to, I devised a method with x rays, which I published at the Bilingual Congress of Radiology in London in 1922. Holfelder of Frankfurt subsequently devised a similar method, which in some ways is an improvement. The principle of each of these is to use the rays at a tangent to the chest and so to avoid damage to more than the superficial parts and the apex of the lung, in both of which it is inevitable. The rest of the lung is protected by lead or other opaque material. The disadvantage of this method is that rays are kept away from the mediastinum, so that skiagrams of the chest must always precede the treatment to show whether there is any obvious mediastinal involvement, and if such be the case a different technique is employed. If the mediastinum is not involved, the tangential method has the advantage that it is much less likely to cause radiation sickness than large doses on the mediastinum.

The supraclavicular region is treated by separate fields, front and back, either at the same time as the pectoral region or at a different time. I prefer the latter method, because I then give the axilla and coracoid regions a second dose, and, as these are the parts most infested by recurrences, the results are better. Ten or twelve weeks should elapse between the two treatments.

The focus-skin distance I use in each of the above is 50 cm., but more will be required if the radiation is less penetrating. I use continuous high-tension current at 170-185 kilovolts (Peeke tables), which is the limit that most tubes will stand. It is found that above 160 kilovolts the dose which will give a skin erythema is enormously larger than below.

For mediastinal treatment I use a number of fields converging on the mediastinum, for preference giving half the treatment on one pattern and the other half on another pattern overlapping this. The focus-skin distance is only 30 cm., and it is not found necessary to give a full erythema dose to any one area. The supraclavicular regions are taken in, whether enlarged glands can be felt in them or not.

Whatever method is employed, I have obtained the best results, so far as x rays are concerned, with the hardest rays.

Radium.

(*a*) *Needling.*—Long radium needles of an active length of 6 cm. if possible, are introduced into the deeper part of the breast or of the tumour, a parallel formation being adhered to and each needle being about 1 cm. from the next, those, however, on the outer edge being slightly closer together. Needles are also introduced into the axilla in similar formation when a primary tumour is being treated, and if possible into the coracoid and supraclavicular regions, especially if the axillary glands are palpable, because the disease has always passed beyond the palpable glands. The needles are made of platinum, with a wall 0.5 or 0.6 mm. thick, and contain 0.5 or 0.6 mg. of radium per cm. active length. They are left in for from six to ten days.

(*b*) *Combined Method.*—After a radical operation tubes are left at the inner end of each of the upper intercostal spaces—say 10 mg. with a 0.5 mm. platinum filter for two days—two or three others in the supraclavicular region, and another tube below the clavicle.

(*c*) *External Applications.*—Either a mould of special wax is made to fit tightly on to the whole breast area, or a splint in some light material, such as celluloid or special thin wood, is made. In the former case the radium tubes or needles are distributed evenly on the wax, which is usually some 3 cm. thick or even more. When the splint is used, little blocks are stuck into it which carry the radium at the requisite distance from the skin. When very large quantities of radium are used, necessitating considerable protection, they are usually carried on a separate apparatus allowing universal movement—something like an x-ray tube stand. Placing the radium directly on the skin does not achieve a sufficiently large depth dose and is out of date.

RESULTS.

On the whole the material with which we have to deal is so bad that our results cannot be good. By the use of radium needles, however, as described above, in a series of cases not so advanced as the bulk of cases supplied, the results are very hopeful indeed. With x rays we have generally had later cases to treat, and while the disease can usually be kept in check for a long time, complete disappearance of the growth is uncommon. Many such cases also are subsequently lost from distant metastases, usually in the pelvis and lumbar spine. A local recurrence of the disease, after apparently complete disappearance, makes us think that the technique is at fault, and we wonder whether it would not be wise in all cases to give a second treatment, possibly using a somewhat smaller dose than the first time, as a prophylactic.

I have seen several cases with what seemed to be definite mediastinal spread, generally with deposits in the supraclavicular glands or other places as well, in which all external evidence of the disease has disappeared, the shadows in the mediastinum have become smaller and lost their characteristic outline, and so far the patient has remained well for two or three years or more. These are rather unexpected and I think we must regard them as lucky, though we always expect to see improvement.

On the whole, therefore, palliation and prolongation of life are the rule, cure the exception. From what we have seen it is obvious that better results may be expected by obtaining the cases in an earlier stage.

When a case is not too far advanced radium seems to give better results than x rays.

There is no question that we could be supplied with a better type of case. The surgical waiting lists at most hospitals are long and a certain number of cases have advanced beyond the curable stage in the weeks during which they wait for a bed. The comparatively short time required for their irradiation would spare more beds for keeping the waiting list short, and eventually more lives would be saved. The use of radium needling in earlier cases has immediately shown marked improvement in the results, and such methods, followed by extirpation if desired, seem to offer a better chance of cure than operation with subsequent irradiation. On the other hand, prophylactic radiation must not be withheld when operation

is the method preferred. So long as surgical removal of a cancer is a recognized method of treatment radiation must also find a place.

DISCUSSION.

Dr. J. H. DOUGLAS WEBSTER (London) advocated the closer co-ordination of radiological and surgical treatment. He thought that increased emphasis on the value of radiology, by diminishing the certainty that operations would be advised, would result in nervous patients seeking treatment earlier for small, painless lumps in the breast, and would thus improve the chances of cure. He believed that in many cases surgical intervention hastened a fatal issue. Local recurrences were less frequent when radiation treatment was commenced within two to four weeks after a surgical operation. Prophylactic *x*-ray therapy was of the greatest value after admittedly incomplete operations—as, for example, when the axillary glands could not be wholly cleared. Local improvement followed radiation treatment, even in inoperable cases, when surgical treatment was sometimes rendered possible thereby. The speaker pleaded for the extension of facilities for *x*-ray and radium treatment of cancer of the breast, since the results were often better than those of surgery. In his opinion operations ought to be forbidden in the case of active tumours which had not been sterilized by preliminary radiation.

Dr. A. E. BARCLAY (Manchester) expressed his admiration of Dr. Finzi's work, and recalled a memory of seeing him in the midst of a litter of broken *x*-ray tubes and other apparatus making an effort to get more intense radiations. Everyone had seen marvellous results with *x* rays and radium, and occasionally people had seen similar benefit without either. There were many types of cancer, and some were amenable to quite local radiations, while others were not. He mentioned two cases which had been operated on many years before and in which there had been supraclavicular recurrence. He decided to treat one patient with rays of ordinary wave-length and the other with deep therapy. The second improved remarkably, and they were very cheered to see the growth disappear, but the patient was dead within six months. The other patient, who was treated superficially, lived much longer. It often happened that the immediate results were good, but the ultimate results poor; he had therefore become conservative and could not share the optimism of either Dr. Finzi or Dr. Webster. While all could obtain wonderful results with *x* rays, it was essential that before they tried to do any good they must ensure that they did no damage. With regard to post-operative treatment, he noted that Dr. Finzi used the maximum dose which the tissues would stand; the speaker could not see the necessity for going to the length of damaging the skin. One extremely important point in post-operative treatment was the period when *x*-ray treatment should be started; if begun within a fortnight or three weeks of the operation there seemed to be a far smaller number of recurrences than in cases in which it was delayed longer.

Professor M. R. J. HAYES (Dublin) submitted figures showing the period after operation at which recurrence took place, and the site of recurrence in fifty-three consecutive cases of mammary carcinoma which had had no post-operative *x*-ray treatment. The period of recurrence in the 53 cases was as follows: 2 weeks in 1 case, 1 month in 5, 2 months in 4, 3 months in 7, 4 months in 2, 5 months in 1, 6 months in 2, 8 months in 2, 10 months in 1, 11 months in 2, 12 months in 7, 18 months in 3, 2 years in 2, 3 years in 9, 4 years in 2, and 5 years in 3. The site of recurrence is shown in the following table.

Site of Recurrence.	First Year.	Second and Third Year.	Fourth and Fifth Year.
Local	12	3	1
Supraclavicular	10	4	3
Axilla	1	—	—
Local and supraclavicular	6	3	—
Local and axilla	4	2	—
Supraclavicular and axilla	1	—	—
Spine	—	1	—
Thorax	—	1	1

The prevailing surgical practice was to regard supraclavicular involvement as a contraindication to operation, but it was apparent from the figures given that in the first-year recurrences there was apparently no clinical manifestation of supraclavicular involvement at the time of the operation, nor was there any evidence of it in the cases which occurred within three years. It was reasonable to suppose that the earlier the recurrence the more malignant was the character of the disease. It might be contended that all the cases in this series were of a very malignant type, and therefore bad surgical risks; nevertheless, they indicated the advanced and almost hopeless stage in which the average patient with recurrent mammary carcinoma came to the radiologist for treatment; they showed also how essential it was always to include the supraclavicular space in prophylactic treatment as well as the pectoral region and the axilla. Such treatment was started usually in the second or third week, and most of the cases were treated according to the older methods, but during the past three years high-voltage rays had been employed. Time was too short and cases too few to compare the results of the newer with the older technique, but his impression was that for the prophylactic treatment of mammary carcinoma massive doses of highly penetrating rays were not only unnecessary but harmful; he believed, as Wintz had stated, that by their injurious effects on the healthy tissues they helped rather than hindered the recurrence of the disease. For precise measurements and accurate dosage on the surface and in the depths of the tissues the newer technique had obvious advantages, but for the prophylactic treatment of mammary cancer he considered that the rays produced by 135 to 155 kilovolts were the most effective. Of fifty patients who had prophylactic treatment seven were known definitely to have had recurrences, and of these seven one died within one year, four in the second year, one was doing badly from a deep-seated recurrence after five years, and one had recurrence after eight years which responded to further treatment, but she died later from the disease. In eleven cases the result was unknown, and thirty-two were known to be alive and free from recurrence after the number of years shown in the following table:

Years:	1	2	3	4	5	6	7	8	9	10	14
Cases:	1	5	4	4	6	3	2	3	2	1	1

The radiologist should have more information than was sometimes forthcoming about the histology of the cases he treated, for there was much evidence to suggest that there might be an optimum quality and quantity of radiation capable of producing a maximum inhibitory or lethal effect on a particular type of neoplastic cell. It was mainly along biological lines that future researches must extend, and the first endeavour should be to discover the relationship which existed between the quality of the radiation employed and the biological effects which were produced not only in the particular type of neoplastic cell, but also in the normal cells surrounding it.

Dr. W. M. LEVITT (London) said that Dr. Finzi had asked him to report on the histological examination of these cases after intensive irradiation had been applied. Four patients had been investigated histologically; they had received intensified treatment by a method which gave them the full tolerance dose for about a fortnight. The histological examination was made about three months after the irradiation. In one case it was found that there had been a most remarkable decrease in the number of malignant cells, and that there was a complete absence of mitosis in the cells which remained. In two cases there was very little decrease in the frequency of the malignant cells, but a complete absence of mitosis, and in the fourth case apparently there was no change in the character of the malignant cell. The obvious question related to the essential element in the malignancy of a tumour; was it the presence of a mitosis or some other characteristic? It was impossible to say. In one of these cases the tumour on removal had been cut right through, and what appeared to be malignant tissue had been left behind, but without mitosis, and the portion of tissue which had been cut through nine months before had not continued to grow. In connexion with the pre-operative treatment of malignant

disease, Dr. Levitt suggested that local excision after irradiation might give a more satisfactory result. With regard to post-operative irradiation, if it was agreed that the selective sensitiveness of the carcinoma cells over the normal cells was proportional to their vital activity, then post-operative irradiation for prophylactic purposes was contraindicated altogether, because any malignant cells which were left after complete operation were in a sort of hibernating condition. They did not commence to grow for quite a time afterwards, perhaps as long as two or three years. In the bulk of cases he thought that pre-operative radiation was preferable to post-operative.

Dr. R. E. ROBERTS (Liverpool) said that the treatment of malignant disease was one of the most depressing occupations anyone could undertake. In any large hospital the *x*-ray department was the dumping-ground for all the surgical inoperabilities. It might be hoped that life was being lengthened, but it was a question whether it was not rather a case of prolonging death. No one could foretell exactly what response would be forthcoming from treatment. It was most disappointing when good curative or perfect prophylactic results followed operation that the patient should die after twelve or eighteen months from secondaries. The speaker thought that those secondaries must have been present from the time of the operation. The question of voltage was a very difficult one, but he thought that Professor Hayes had hit the nail on the head when he stated that for each type of malignant disease there was an optimum voltage; some cases responded best to high voltage and others to medium. The type of treatment had to be gauged by the general condition of the patient. In Liverpool a good deal had been done in the treatment of malignant disease by injections of lead, and in the treatment of several of those cases subsequently by *x* rays he had found that the lead injections apparently assisted the *x*-ray action, the patients doing better than those who were subjected to *x* rays without having had the lead treatment; there was a more intense secondary radiation.

The PRESIDENT (Dr. Woodburn Morison) asked what it was they were attempting to do when they irradiated breast carcinoma. If they were trying to destroy every individual cell in the breast they were committed to what was physically an impossibility. This could be easily demonstrated from the standpoint of pure physics. It would be found that calcification had taken place in some areas approximating quite unchanged cancer cells. From the physical point of view they could never accomplish in that way the pure destruction of a breast carcinoma. Dr. Barclay had mentioned two patients, one of whom, treated with deep therapy, had improved at first but died within six months, and the other, treated superficially, had lived much longer; but his comparisons were not complete. He should have taken an untreated patient and observed how long life lasted. He wondered what would be the general average duration of life if a case of cancer were left entirely alone, and how it would compare with the duration in cases in which operative followed by radiological treatment had been applied.

Dr. FINZI, in reply, said that he believed it to be correct that every tumour had an optimum wave-length at which the treatment would do more harm to the carcinoma with less harm to the surrounding tissues than at any other wave-length. So far as he had gone, it seemed to him that with the pushing up of the voltage better results were obtained in carcinoma, and he still thought the optimum wave-length had not been reached, because it was at present above the range which tubes would stand. Dr. Barclay had suggested that the immediate results were good and the ultimate results bad; the speaker thought that this was simply because the right technique had not yet been worked out. He denied that he was an undiscriminating optimist with regard to radiation treatment of breast cancer; he was an optimist in the case of localized breast carcinoma, but the trouble was that they did not get cases like that to treat. In the cases described in his paper as having been treated with radium needles the results had been so satisfactory that at present the surgeon had refused to remove the breast because he could not feel anything at all. Thus there could be no actual proof that in these cases the carcinoma cells had disappeared, but it was known that in the cervix every carcinoma cell could be made to disappear; that had been shown by others, using either radium or *x* rays. He rather thought that that was the objective in breast carcinoma. As to massive doses for prophylaxis, he would retain his view; he believed in the hibernating cell, and that it was ready to grow. Dr. Roberts had asked whether any good at all was being done: but the older radiologists had seen patients who had remained well for five to ten years after treatment. He regarded the skin erythema as necessary because the dose which produced it was about the optimum for eradicating carcinomatous disease—he would not use the term "carcinomatous cells." Some had maintained that carcinoma started as a generalized disease with a localized manifestation; Dr. Finzi did not believe that the disease originated in the blood or tissues generally, but that it started locally and subsequently became general; otherwise, how could any disease at all be treated? He did not now get burns in the lung, because he had improved his technique. The goal of their attempts was to destroy all evidence of disease, and so to treat the patient that no carcinoma cells would develop. It was possible that there might remain encysted hibernating carcinoma cells in the tissues, but so long as these did not develop all was well.

The Section of Radiology.

At the conclusion of the meeting Dr. L. A. Rowden (Leeds) made a protest against the confinement of the Section proceedings to one day only of the Annual Meeting; Dr. A. E. Barclay associated himself with the protest, which the President of the Section promised should be conveyed to headquarters.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

CHRONIC FIBROUS EPIPLOITIS.

THE publication by Mr. R. Charles B. Maunsell, in your issue of June 11th (p. 1051), of his article on chronic fibrous epiploitis, prompts me to record a case which presents many similar features.

A Chinese boy, aged 10, was brought to me with symptoms of intestinal obstruction of three days' duration. A large, hard, tender mass occupied the lower portion of the abdomen, and extended from just above the umbilicus to the symphysis pubis.

The abdomen was explored by a right paramedian incision below the umbilicus. On opening the peritoneal cavity a dense, tough membrane was found spread out in front of the abdominal viscera, in a manner very similar to that described by Mr. Maunsell. This membrane was divided in the line of the peritoneal incision, thus exposing the intestines: about two feet of small bowel were found to be gangrenous. Strong septa, similar in structure to the membrane lying in front of the viscera, passed backwards from it to the posterior abdominal wall, thus dividing the abdominal cavity into a series of loculi and binding down and constricting the intestines. One of these septa had, by obstructing the upper part of the ileum, resulted in the gangrenous condition of the two feet of gut immediately below it. The septa and adhesions were divided sufficiently to free healthy bowel above and below the gangrenous portion, preparatory to resection. At this point, however, the patient suddenly collapsed; a Paul's tube was inserted into the ileum proximal to the gangrenous portion, and the patient was returned to the ward. Subcutaneous saline injections, and the administration of glucose solution by the mouth and rectum, resulted in so great an improvement that, although by no means optimistic as to the chances of ultimate recovery, I opened the abdomen again through the original incision on the third day following the first operation. It was found that the gangrenous portion of intestine had walled itself off from the rest of the abdominal cavity, occupying a loculus of which the walls were largely formed by the adventitious membrane. The afferent and efferent healthy gut passed through the walls of this loculus to join with the gangrenous portion. The gangrenous intestine was resected, the cut ends closed, and side-to-side anastomosis was performed. Unfortunately, however, the extensive nature of the resection proved too much for the patient in his debilitated condition, and he died a short time after the completion of the operation.

Microscopical examination of a piece of membrane removed for section showed that it was composed of fibrous tissue, upon which were superimposed the changes of acute inflammation. These changes, which were secondary to the gangrenous condition of the intestine, prevented any conclusions being reached as to the intimate structure of the fibrous membrane. The thickness of the membrane was approximately 1½ mm.

I think that the points of similarity between this case and that described by Mr. Maunsell are sufficient to allow of their being considered as examples of the same pathological condition. In both there was present an adventitious membrane of similar characteristics, specialized portions of which were causing intestinal obstruction. It is perhaps suggestive that Mr. Maunsell's patient, a European, should previously have suffered from bowel disease of a type very prevalent in the tropics.

Shanghai. A. C. MACONIE, M.B.Lond., F.R.C.S.Eng.

DEATH AFTER ANAESTHESIA: STATUS LYMPHATICUS.

THE following case, having some instructive and extraordinary features, is, I think, worth recording.

A boy, aged 7, with well marked signs and symptoms of enlarged tonsils and adenoids was operated upon. He had the usual preoperative preparation—namely, an aperient the night before and no food before operation. Anaesthesia was induced with a mixture of C. and E. (1 : 3) followed by pure ether, and was not remarkable in any way; the operation was successfully performed and there was no excessive haemorrhage. The patient had sufficiently recovered from the anaesthesia to cry out after the operation was concluded, and he afterwards sat up and talked to the nurse in charge. An hour after operation he suddenly turned a "nasty" colour, and when seen, immediately, by the house-surgeon was rather of a blotchy purple blue, but not generally cyanosed. He was pulseless and respiration had ceased. The usual remedies were tried—namely, artificial respiration, camphor oil, etc.; cardiac massage, intracardiac and adrenaline injections were not used—without any response.

Necropsy.—The body was of average size and conformation and of average weight. It showed, generally, a blotchy purple discoloration, very much like ordinary *post-mortem* staining. The heart was empty; the lungs were not congested and were well aerated. There was a small amount of blood-stained fluid in the trachea, but no clot. No sign of embolism was noted. The liver appeared normal. There were no petechiae anywhere. The thymus, triangular in shape, covered the palm of an average hand ($2\frac{3}{4} \times 2\frac{1}{2} \times \frac{3}{4}$ in.). There was general enlargement of mesenteric glands, several being the size of an average walnut. The cervical glands were appreciably enlarged, but not matted or showing obvious signs of inflammation. The cause of death was given as "status lymphaticus."

The length of time before death after anaesthesia, and the lack of incident in the induction of anaesthesia, seem so extraordinary as to merit record, and the whole sequence of events, particularly the sudden and simultaneous cessation of all the vital functions, suggest the cause as being a vagotonic action due to hypersecretion of the thymus gland.

York. J. ACOMB, M.B. B.S.Lond.

CHOLECYSTITIS WITH ASSOCIATED PANCREATITIS.

THE following details of a case in which cholecystitis was associated with pancreatitis seem to be worthy of record.

A married woman, aged 58, first attended as an out-patient in December, 1926, with a history of recurrent attacks of pain and tenderness in the right hypochondrium accompanied by vomiting, jaundice, and clay-coloured stools; she complained of flatulent dyspepsia aggravated by taking meat. These attacks had been intermittent for a period of five years, during which time glycosuria had coincided with the abdominal pain, disappearing in the intervals. She had had dietetic treatment but no insulin.

On admission to hospital on April 4th, 1927, in addition to the preceding signs and symptoms, she was extremely tender over the gall bladder and there was slight jaundice. She weighed 8 st. 5 lb. The urine contained 2.6 per cent. of sugar and gave a faintly positive reaction with ferric chloride. There was hyperglycaemia, the actual figures of which unfortunately cannot be traced. A diagnosis of cholecystitis with associated pancreatitis was made, and it was decided to operate as soon as the urine could be rendered sugar-free; accordingly insulin was administered in doses of 25 units twice daily, which effectively controlled the glycosuria.

On May 2nd Mr. Clifford Moore removed the gall bladder, which was small and shrunken and contained a few faceted stones; there was definite pancreatitis. The wound healed by first intention, and three weeks later the patient was discharged on a slightly modified diet and twelve units of insulin twice daily.

Three months after the operation she was perfectly well, taking an unrestricted diet, and had increased 2 st. in weight; there was no acidosis, and only an occasional trace of sugar in the urine.

The glycosuria in this case was apparently due to pancreatitis secondary to chronic inflammation of the biliary tract, and, although of five years' duration, cleared up after cholecystectomy.

I am indebted to Dr. Carey Coombs and Mr. Clifford Moore for permission to publish the notes of this case.

Bristol. PERIS BRINCKMAN, M.B., M.R.C.S.

Reports of Societies.

SURGERY IN THE XVIIIth AND EARLY XIXth CENTURIES.

THE first meeting of the 155th session of the Medical Society of London was held on October 10th, when Sir HUMPHRY ROLLESTON relinquished the chair and inducted into it the new President, Mr. HERBERT W. CARSON.

Mr. Carson took as the subject of his address from the chair "Surgery in the early days of the Medical Society of London." He began with a sketch of the troubled political and social conditions of the last quarter of the eighteenth century, and said that during the first forty years or so of the Society's existence (from 1773 until Waterloo) England was in a state either of war or of social unrest which seriously affected all scientific pursuits, surgery included. The French Revolution was stated to have put back the progress of surgery in France so materially that France as a consequence lost the premier place in surgery, which before the revolution it had held. An interesting feature of surgical life at this time was the visits paid by surgeons to other countries. Not only did surgeons visit their colleagues abroad, but they expressed very frank opinions on what they saw. Cheselden (1688-1752), who was probably the best known surgeon in Europe in his day, received a deputation from Paris who had come to watch his operation of lateral lithotomy. Benjamin Bell of Edinburgh went on a tour in 1771, for which he asked his father for £150, stating that if he had intended to confine himself to medicine he would have been content to stay in Edinburgh, but as he was going to take up surgery a visit to London and Paris was essential. Another traveller was Astley Cooper, who in early life went to France, Italy, and Germany; and Abernethy at about the same time took a similar tour. Roux, the great French surgeon, in a book containing his observations on surgery in London, could not give greater praise to Charles Bell than to say that he "operated in the French manner." John Cross, visiting Paris in 1815, had many appreciative things to say of French surgeons. He watched Dupuytren operate on strangulated hernia, the operation taking place in the middle of the night, in a crowded ward, where the surgeon was surrounded by a press of students holding candles.

With the increase in the number of hospitals in London as the eighteenth century advanced more facilities were available for students, but teaching made slow progress. Even in 1816 Roux, comparing the opportunities for students in London and in Paris, said that in London the students gave considerable sums for liberty to frequent the hospitals. None of the courses in London was gratuitous, even to those of the students who had the right of frequenting the hospitals where the courses were given, and Roux considered that the College in London was not to be compared with the corresponding Faculty in Paris. The museum in London, he said, was less a museum of anatomy than a collection of natural history, or at all events comparative anatomy. To meet the demands of students the surgeons arranged for private classes. William Hunter founded his school of anatomy in 1770, John Hunter had his own school, and Hewson also founded a very successful school.

In trying to form a picture of the surgical work of the period it must be remembered that the surgeons suffered from two great handicaps—the absence of anaesthetics, and the absence of means for preventing sepsis. It followed that the scope of operations was limited by the speed factor, and that the great majority of the operations done to-day would have been impossible, not only because of the need for haste, but because of the inevitable infection. Some attempt was made, by compressing the sciatic and crural nerves by means of a clamp, to numb sensation for an amputation, but this was given up. There were long arguments as to the right time to amputate. On the whole, surgeons were agreed that to amputate in spreading gangrene was fatal. Lithotomy was a great test of the surgeon's skill, and in most of the books of the period the operation was described in the minutest detail. Operations

for hernia were limited to reduction of strangulation. Pott, in 1769, referred to "rupture doctors" as "murderers who ought to be hanged." Surgeons at this time did their own eye work. Not until the foundation of Moorfields in 1810 did specialization arise, and this specialization did not please Roux, who said that it tended to consolidate what ought to be prevented—the separation of ocular from general surgery. Abdominal surgery until the nineteenth century was practically non-existent; except in the treatment of perforating wounds nothing was done; Hunter discussed the possibility of washing out the abdomen in peritonitis, but never did it.

Mr. Carson concluded his survey by quoting Sir William Fergusson, who stated that about 1825 there was a period of calm such as there had not been for many years, and such as a later generation of surgeons had never seen. There was nothing new in British surgery, and little from abroad to attract attention. Nevertheless, the scientific method was creeping into teaching, and for this development the first credit was due to John Hunter, the bicentenary of whose birth would be celebrated in February of next year.

PITUITARY DISEASE.

AT a meeting of the Manchester Medical Society on October 5th, with the President, Dr. J. GRAY CLEGG, in the chair, Dr. GORDON HOLMES gave an address on pituitary tumours.

He said that recent investigations went to show that many of the functions which had been attributed to the pituitary belonged to the nervous structures in the base of the brain, especially in the hypothalamus. At present the only function that could with certainty be ascribed to the anterior lobe of the pituitary was an influence on growth, but it probably also controlled the development and activity of the sexual organs. Though extracts of posterior lobe had obvious effects when administered by injection, its normal function was still unknown. The clinical symptoms of pituitary disease could, however, be still most satisfactorily divided into those attributed to an overfunction of the gland, or rather of its anterior lobe, and those resulting from its destruction or deficient activity. The chief symptoms of hyperpituitarism were acromegaly when the disease commenced after adolescence, and gigantism, with which certain features of acromegaly or of hypopituitarism were often associated, when it began before normal growth was completed. The symptoms of hypopituitarism were more common and more varied. Dwarfism, usually associated with underdevelopment of the sexual organs and absence of the secondary sexual characters, resulted from destructive lesions of the gland before the age of puberty. It was usually due to extrasellar tumours and other conditions that compressed the pituitary, for adenomata of the gland were rare at this age. Metaplasic adenomata developing after puberty produced Fröhlich's syndrome, or dystrophia adiposo-genitalis, which was characterized by obesity, absence or regression of sexual development and of the secondary sexual characters, disturbances in carbohydrate metabolism, and frequently somnolence and polyuria. In addition to these symptoms, which were usually regarded as a direct result of the pituitary disease, other symptoms due to the pressure of the tumour on neighbouring structures were often present. At first the intrasellar tension, and later the increase of general intracranial pressure, produced headache and occasionally vomiting, while the compression of one hemisphere or of a cerebral peduncle might give rise to a hemiplegia. More characteristic symptoms were due to compression of the visual paths, which produced more or less characteristic defects in the visual fields, the type of which depended on where the pressure acted. When the chiasma was situated posteriorly one optic nerve generally suffered first, so that unilateral blindness resulted; this was usually followed by a temporal hemianopia in the other eye when the tumour extended back to the chiasma. When the chiasma was first involved an irregular bitemporal hemianopia was found, while the loss was mainly of the homonymous hemianopia type when the tumour compressed one optic tract. One early and frequent feature of the visual defects, which was often forgotten, was the occurrence of scotomata, either central, when the optic nerve was compressed, or more commonly paracentral in the temporal fields. The ocular nerves were frequently involved, too, causing squint and diplopia. At present the most reliable treatment of pituitary tumours was operation, which had become a moderately safe procedure in skilled hands, but good results had been obtained by radiological treatment, and it seemed that further development of this method might be expected. Glandular treatment, either to control the growth of the tumour or to relieve the symptoms of deficiency, had rarely given satisfactory results, but recent experimental investigations gave promise of greater success in the future.

ELECTRO-CARDIOGRAPHY.

AT a meeting of the Brighton and Sussex Medico-Chirurgical Society on October 6th, Dr. DONALD HALL delivered his presidential address, entitled "Some help obtained from electro-cardiography."

Dr. Hall's address was based on the examination in private practice of 419 patients during a period of 3½ years, and a short description was given of the method of examination and the normal electro-cardiogram. The speaker said that this method of examination supplemented but did not supplant ordinary clinical methods, and no claim was made that electro-cardiography uttered the final word in diagnosis. Information regarding disorders of rhythm was given equally well or better by the electro-cardiogram than by the polygraph, and in the case of the myocardium the polygraph was silent. In graphic methods the electro-cardiogram had superseded the polygraph in all pathological conditions except pulsus alternans, in which the sphygmograph was the more reliable. The various types of cardiac irregularities were demonstrated by lantern slides of electro-cardiograms, and it was shown that the differential diagnosis of all these varieties could be obtained with absolute precision. One woman, aged 26, consequent upon the diagnosis of "heart strain" had assumed an invalid's life, but the electro-cardiogram had disclosed a striking example of sinus irregularity; it was evident that the original diagnosis had been incorrect, and upon it, by suggestion, followed the patient's illness, which yielded to appropriate treatment. This was the only form of cardiac irregularity which was purely physiological. While premature beats were in many cases of but minor importance, each case had to be considered on its merits. In general terms auricular and junctional premature beats were more frequently due to extrinsic causes, and in many instances the patient was unaware of their presence, while the ventricular premature beats were intrinsic in origin and the patient was usually cognisant of them. At times multiple premature ventricular beats might be the main cause of the patient's subjective symptoms, particularly of giddiness and faintness; these symptoms disappeared on restoration of the normal rhythm. Simultaneous electro-cardiograms and pulse tracings demonstrated that, although the premature beats gave large complexes in the electro-cardiogram, they were dynamically but feeble contractions, and thus while "extra-systole" was a misnomer, the term "dropped beat" was often correct so far as the pulse at the wrist was concerned. Dr. Hall then discussed the probability of the QRST complexes being able to give information otherwise unobtainable of the state of the myocardium. Electro-cardiograms were shown of two patients who were known to have had auricular fibrillation for fifteen years. In both of them the QRS was of normal outline; in one the T wave was unchanged, but in the other it showed the negativity of digitalis control. Slides were also shown of fibrillation before and after treatment by quinidine. Dr. Hall explained the essential difference in the treatment of auricular fibrillation by these two drugs, and also criticized the indiscriminate use of digitalis in cardiac affections, whether functional or organic. Observation of alteration in the ventricular complexes had given really important information, sometimes where clinical evidence was but scanty or had been absent. Sixteen instances of right bundle branch block had been met with in the series, the lesion affecting the left division in

three, and the right in thirteen cases. In his hospital practice the lesion of the right division had also been more numerous. In the series under review there had been thirty-five patients in whom the T wave was negative in Lead I or Lead II or in both. Three cases were untraced, but of the remaining thirty-two patients, sixteen were alive and sixteen were dead. This T negativity he had found relatively frequent in cases of angina pectoris, and examination by the electro-cardiograph had proved useful in strengthening the medical attendant's hand in the treatment of refractory patients. Slides were shown of heart-block, complete and partial; of the former one instance had been met with in a woman of 25, in whom the block seemed to be an isolated lesion. When young women complained of such symptoms as pain, faintness, palpitation, and shortness of breath, and on examination yielded little or nothing in the way of physical signs, and mitral stenosis could be excluded, it was safe to assume that the chest pain, which typically was submammary and not retrosternal, was not of cardiac origin. A demonstration was given of the large P wave met with in mitral stenosis, but it was emphasized that with this one exception the electro-cardiogram was not concerned with cardiac murmurs. Middle-aged people, particularly men, were the most difficult cases of all; help was often obtained from the blood pressure and from the urine, but in a residue information could only proceed from an electro-cardiographic examination.

JAMES MACKENZIE INSTITUTE.

The winter course of lectures at the James Mackenzie Institute for Clinical Research, St. Andrews, was opened with an introductory address by the honorary director, Dr. A. Maitland Ramsay, on the ocular manifestations of gastro-intestinal disorder. He pointed out that in gastro-intestinal diseases the causal relationship between the general disorder and the ocular symptoms was not nearly so direct and intimate as it was in the case of cerebral, renal, or circulatory affections, but that in an indirect way, through the agency of micro-organisms and of bacterial or biochemical toxins, gastro-intestinal disturbance played an important part in causing or in aggravating diseases of the eye. Attention was drawn to the reflex disturbances in the eye caused by dental caries or septic tonsils, which were also mentioned as the cause of acute or of chronic inflammation of the eyeball. A careful distinction was drawn between chronic intestinal auto-infection and chronic intestinal auto-intoxication, and in this connexion reference was made to the work of Desgeorges. Disordered metabolism was regarded as the underlying cause not only of inflammation of the uveal tract, but also of acute glaucoma and of toxic amblyopia, and the influence of persistent constipation on the occurrence of intra-ocular haemorrhage in young adults was fully discussed. The attention of the general practitioner was directed to the possibility of atrophy of the optic nerve following severe haematemesis. The retinal ischaemia was regarded as a favourable condition for the action of a toxic or other infective agent, whose existence may be assumed although it did not admit of strict scientific proof. The lecturer concluded with a description of a group of eczematous affections of the eye associated with disordered carbohydrate metabolism, and said that in the treatment of these conditions it was necessary to pay special attention to the diet, and also to take means to promote free elimination of the metabolic toxins which had accumulated in the blood.

Dr. Souter, in opening the discussion, referred to the wide experience of ophthalmology and of general medicine that Dr. Ramsay could draw upon. Dr. Souter touched on several of the points raised in the address and gave a short summary of those varied gastro-intestinal disorders, functional, organic, and toxic, in which eye features were likely to be met with, illustrating his remarks by reference to personal experience in several instances, special emphasis being laid on the help obtainable from an examination of the eyes in cases of unsuspected luetic affections.

Rebiews.

ANGINA PECTORIS: SURGICAL TREATMENT.

In an elaborate work on angina pectoris[1] Professor Daniélopolu expounds the rationale of the surgical treatment of the disease. The book, however, is not confined to that topic, but forms a complete treatise on the subject of angina pectoris, its etiology, symptoms, and pathogenesis, and the pathological anatomy is considered at great length. With regard to surgical treatment, the author states that the first suggestion of sympathectomy was a remark of François Franck's at the Académie de Médecine in 1899: "This new idea of aortic sensibility transmitted by the cervico-sympathetic suggests the possibility of practising its resection in angina pectoris." The first operation of the kind was performed by Jonnesco and Gomoin in 1916, but the results being by no means encouraging, Jonnesco inclined to the opinion that the suppression of the anginal attacks required division, not of the sensory fibres proceeding from the heart, but of the efferent fibres to the heart passing from the bulbar and spinal centres, which would include the accelerator nerves and some of the coronary vasomotors. The attacks being regarded as due to a reflex from the heart, the object was to cut the afferent (Franck) or the efferent (Jonnesco) limb of the arc. Other operators endeavoured merely to relieve pain by the free division of the sensory fibres, without regard to the reflexes; the results were not of a kind to encourage a continuance of the practice.

Daniélopolu's contribution to the subject consisted in the propounding of a theory of the pathogenesis of anginal attacks, based on his own and others' experience; and, secondly, in defining the limits of safety in operating in accordance with the theory—a problem mainly of ascertaining the precise anatomical routes followed by the nervous impulses passing to and from the heart. His theory is that owing to defective blood supply (for example, from coronary disease) fatigue products accumulate in the heart; when they reach a certain amount they irritate the sensory nerves, and there results not only pain, but also reflex stimulation which he considers to be predominantly pressor (that is, raised blood pressure, acceleration of the rhythm, increased force of contraction, and probably coronary vaso-constriction); the malnutrition of the heart is exaggerated by these pressor effects, the sensory nerves become still more irritated, and thus a vicious circle ("reflex pressor circle") is established, which culminates in the anginal attack. The author contends that the proper treatment for this condition is to suppress the pressor circle by intercepting as many of the cardio-aortic sensory fibres as possible while preserving the efferent fibres passing to the heart from the medulla and upper part of the cord, since interference with the latter would be dangerous to the patient by destroying the pressor mechanism altogether. A large part of the book is devoted to a description of the nervous mechanism of the heart and to tracing the routes of the various impulses passing to and from it. From a minute investigation of the existing evidence on the subject—anatomical, physiological, pathological, and that derived from comparative anatomy and from incidental observations in the course of operations on the human subject—the author concludes that some of the sensory fibres pass along the inferior cardiac sympathetic nerves to the stellate ganglion, thence down the sympathetic trunk to the rami communicantes of the second, third, and fourth dorsal spinal nerves, and that the pressor fibres descending from the medulla traverse the same route to the heart. These structures, therefore, it is dangerous to touch. But a number of other sensory fibres, avoiding this route, pass by way of the stellate ganglion, and in the upper and middle cardiac nerves of the sympathetic and branches of the vagus; these can be divided without endangering the pressor mechanism. Daniélopolu therefore advised an operation in two stages: first the division of the sympathetic trunk above the

[1] *L'Angine de Poitrine et l'Angine Abdominale.* Par D. Daniélopolu. Paris: Masson et Cie. 1927. (Demy 4to, pp. viii + 443; 158 figures. 140 fr. sans majoration.)

inferior cervical ganglion, of the upper and middle cardiac nerves of the sympathetic, of the vagal branches descending into the thorax, of the rami communicantes of the last three cervical and first dorsal nerves, and of the vertebral nerve running from the inferior cervical ganglion of the sympathetic. In the second operation the trunk of the cervical sympathetic is removed above the inferior cervical ganglion. Thirteen cases in which the operation had been carried out are described, and appear to justify the author's opinion as to the advantages to be anticipated from it.

Daniélopolu's book is a genuine contribution to the subject; it is a serious attempt to discover guiding principles in operating for angina, to replace the empirical division of this or that nerve in the hope that some benefit will accrue.

CLINICAL PHYSIOLOGY.

In an interesting volume, not too long, entitled *Clinical Physiology in Relation to Modern Diagnosis and Treatment*,[2] Professor McDOWALL has brought together a large proportion of those facets of the science of physiology which are particularly relevant to an understanding of the manifestations of disordered function—the concern of the art of medicine. He takes a wide view, for he devotes chapters not only to topics commonly treated in textbooks of physiology, but also, for example, to "Life as a clinical entity," "Consciousness," "Some physiological aspects of psychology and psychotherapeutics," and "Protection against disease." But it is not to the choice of material, but to its distinctive treatment, that we look for characteristics justifying the recognition of a definite subject—clinical physiology. With the sciences of medicine, pathology, and physiology, well established, it may perhaps be questioned whether such an addition to the ordinary classification is profitable. Professor HALLIBURTON, in a short introduction, expresses the opinion that those who give instruction in physiology cannot teach what will later be of use to the medical student in the wards, and that clinical teachers are not always capable of inculcating physiological knowledge if it deals with recent discoveries and views. This book is intended to remove these difficulties.

The immense number and variety of conditions of medical interest discussed in so short a volume entail a mode of approach which is inevitably sketchy. The physiological "explanations" of symptoms, for example, are in terms of conclusions reached by physiologists concerning the mechanisms they have studied. The further step of relating these hypotheses to the experimental facts they summarize is rarely attempted, since a knowledge of textbook physiology is taken for granted in the readers to whom the book is addressed—senior medical students and practitioners. If the wisdom of undue emphasis on incomplete correlations of this kind is to be questioned, it would be partly because the student already has opportunities of hearing just such sketchy presentations at the bedside, and partly because facile judgements may be based on explanations in which the standards of evidence are not sound, to the detriment of the progress of medicine and of the repute of physiology. Is there a class of readers, for example, that needs to be told what are the Ewald and Rehfuss methods of investigating gastric contents, and that can usefully apply a discussion of the mechanism of duodenal regurgitation described by Bolton and Goodhart, without the further information, here omitted, as to the evidence on which the discovery rests? The omission of figures and curves from the text has saved space, but has obscured crucial steps in some of the author's arguments.

The work, in spite of a good many misprints, of some ambiguous phrases, and a few notable omissions—as of Cheyne-Stokes respiration—is full of valuable material, which will enrich the medical experience of a reader who has not had recent opportunities of watching physiological developments.

[2] *Clinical Physiology in Relation to Modern Diagnosis and Treatment.* By Robert John McDowall, D.Sc., M.B., F.R.C.P.Ed. With an introduction by W. D. Halliburton, LL.D., F.R.C.P., F.R.S. London: E. Arnold. 1927. (Demy 8vo, pp. viii + 424. 21s. net.)

VACCINE THERAPY.

THE scope of LEONARD S. DUDGEON'S *Bacterial Vaccines and their Position in Therapeutics*[3] is well summarized in the preface: "No attempt has been made to review the literature of this vast subject. . . . I have attempted to place on record my direct personal observations, based on twenty years' experience of the vaccine treatment of acute and chronic bacterial infections. There is little doubt that many of the views and conclusions recorded in this short monograph on vaccine therapy will not be in agreement with the much too optimistic statements so frequently made on the subject. No one who has studied vaccine treatment seriously can question its value, but it is equally important to understand its limitations. The selection of cases suitable for vaccine treatment requires much experience, while the problem of dosage, which is different in every case, is still far from understood. In prophylaxis vaccine therapy has done great work." The book is divided into nine chapters, the first three dealing with the principles, production, and standardization, the fourth with prophylactic inoculations, the fifth with acute generalized bacterial infections, and the others with infections of the genito-urinary system, of the gastro-intestinal system, of the mouth and respiratory system, and of skin, connective tissue, bones, and joints. The book should prove most helpful to all who are interested in the subject.

TROPICAL MEDICINE.

To the series of books published by Masson of Paris under the general title "Précis Médicaux" there has been added a volume on tropical medicine,[4] by Professor JOYEUX, now of Paris, making a companion volume to Brumpt's well known *Précis de Parasitologie*. It is divided into two parts: the first deals with diseases of the various systems and organs of the body, the second with tropical fevers. To the English reader such an arrangement, whereby amœbic hepatatis and liver abscess are divorced from intestinal amœbiasis, will perhaps appear unsatisfactory. Again, sprue follows in sequence after the flagellate diarrhœas. Familiarity with this plan is, however, soon gained, and the subject matter is excellent. What shall and what shall not be included in a textbook of tropical medicine is a difficulty every author has to meet, and the author, in his preface, quotes Manson as his guide:

> "If by tropical diseases be meant diseases peculiar to, and confined to, the tropics, then half a dozen pages might have sufficed for their description. If, on the other hand, the expression tropical diseases be held to include all diseases occurring in the tropics, then the work would require to cover almost the entire range of medicine."

Joyeux has therefore followed very much the lines of our own well known textbooks, but there are certain differences. Systematic parasitology and bacteriology find no place in this volume, a departure which, for the English student of tropical medicine brought up on what may be called the "Manson tradition," must appear a retrogression. On the other hand, the clinical descriptions are good in the main, though perhaps greater clearness would have been attained had such diseases as malaria, trypanosomiasis, and recurrent fever been described in separate paragraphs under the several varieties of parasite.

Alastrim, scurvy, Malta fever, and trench fever are dealt with, but not pellagra, and it might have been well to have embodied some notes on syphilis, tuberculosis, and pneumonia as seen in native races.

The book on the whole is up to date, but here and there is a failure to note recent work, such as the treatment of malaria by plasmochin, or the treatment of climatic bubo by the method advocated by Hanschell. It is interesting, however, to see references to the fever caused by the bites of amblyomma, to the epidemic jaundice of spirochætal origin described by Blanchard at Brazzaville, and to the

[3] *Bacterial Vaccines and their Position in Therapeutics.* By Leonard S. Dudgeon, C.M.G., C.B.E., F.R.C.P.Lond. Modern Medicine Monographs. Edited by Hugh Maclean, M.D., D.Sc. London: Constable and Co., Ltd. 1927. (Demy 8vo, pp. vii + 87. 7s. 6d. net.)

[4] *Précis de médecine coloniale.* Par Ch. Joyeux. Paris: Masson et Cie. 1927. (5 × 7½, pp. 851; 138 figures. 65 fr. sans majoration.)

condition called "halzoun" in Libia, due to the ingestion of goat's liver harbouring fasciola hepatica. The author also appears to accept a spirochaetal etiology for blackwater fever. Most of the illustrations reproduced from photographs are good; some others are poor.

It is always interesting to read a textbook in another language, but, while the present volume will prove of great value to those for whom it has been written, the English student will probably prefer the books with which he is already familiar.

INJECTION TREATMENT OF VARICOSE VEINS.

To those interested in the treatment of varices by the injection of sclerosing substances we can recommend a small book, *The Modern Treatment of Varices*,[5] a translation into English by Dr. T. C. MERRILL of an essay by Dr. LOUIS HUMBERT.

The author bases his recommendations on seven years' experience; the best method in his opinion is the injection of sodium salicylate into the veins. He follows this up by applying strapping, a procedure other surgeons have not considered necessary. Adhesive bands, consisting of strips of gauze smeared with Unna's paste, are applied from the root of the toes to the popliteal space. It prevents swelling of the limb, abolishes distension of the varices, and relieves congestion through the dehydrating properties of the glycerin present in the paste. The patient may continue his regular occupation with the strapping on. Ascending and descending injections are made; the latter are more commonly used. The manner of making the injections, the position of the patient, the disadvantages, contraindications, and the practical applications of the method are all described in detail.

To those who prefer the sodium salicylate injection this book should especially appeal.

CRIMINAL PSYCHOLOGY.

AN important study of criminal psychology, entitled *The Psychology of Murder*,[6] by ANDREAS BJERRE, Professor of Criminal Law at the University of Dorpat, has been translated from the Swedish with the idea of spreading in foreign countries a knowledge of Swedish legal methods. The work in the main is made up of a very detailed study of the life history of three murderers. The author claims that if the comparatively new subject of criminal psychology is to advance, it must be by personal observation and personal contact with individual examples of crime. Whilst believing that in the case of theft and of offences against public decency and morality it is possible to make out groups or types, Bjerre states that so far it has not been possible to do this where murder is concerned. The careful histories of the three criminals in this volume bear out this conclusion. There is nothing from which it would be possible to draw any generalizations. A very much larger series of investigations is necessary before the aim of the author to find types can be realized.

The method adopted by Bjerre is to throw as far as possible a clear light on the determining factors in the psychic development of the criminals from a period as far back in their childhood as he could reach to the day they committed their crime, and then to advance to psychic facts and processes of which the persons under observation had either never been conscious themselves or of which they, at any rate, had lost recollection and which they would therefore deny if presented to them. The author does not claim that by this method he has reached any very decisive results, but he believes that in this way there is a possibility of piercing the psychic life of an individual and discovering what is or has been in his mind.

In the course of his investigations the author arrived at certain definite conclusions. He is firmly convinced that all attempts to explain the psychic life of criminals by assuming sexuality as the primary and determining force in their lives is doomed to be either a superficial and often unworthy juggling with words, or else, by arbitrary and fundamentally misdirected surmises, to divorce investigation from reality. He has formed the definite opinion that conscious and unconscious deviations from normal sexual development are, apart from certain forms of homosexuality, only symptoms or effects of deeper-seated psychic defects and are never primary causes of the growth of criminal qualities. He does not accept the popular view that the confessions of criminals are either the result of remorse or a realization that further denial is useless. In the case of murderers he believes that without exception they confess because they expect to obtain some advantage or because they recognize the justice of their sentence. He is of opinion that the anthropological school of Lombroso may, as the result of further investigation, be justified in their view that there is an affinity between the lowest and most primitive races and criminals.

This study of criminal psychology reveals many interesting points in the mental outlook of the three convicted murderers and in the motives which led to their crimes. The author had hoped to continue his investigations, and possibly arrive at a stage when he could make a more definite pronouncement on the question of types or groups in the case of murderers. His early death has unfortunately precluded the realization of this wish. The work is well worth the study of all interested in criminal psychology.

SIGHT AFTER MID-LIFE.

As we have already had occasion to mention, the staff of the medical school of Harvard University give public lectures in medical subjects of general importance, and a number of them have been published under the general title "Harvard Health Talks." The fourteenth of the series is by Dr. J. Herbert Waite, instructor in ophthalmology in the medical school. It is entitled *Saving Eyesight after Mid-Life*.[7] He begins with the statement that 55 per cent of cases of total blindness result from causes within the body, which operate scarcely at all before the fortieth year, but with increasing frequency as age advances. After a sketch of the processes of sight, he proceeds to the chief cause of the loss of sight in age—glaucoma. He states that in the United States it causes one-third of all blindness arising after the fortieth year. Yet this disease practically always yields to certain forms of treatment provided the patient receives the treatment early enough. He then shows how the circulation of the fluids within the eye is maintained and what tends to check the balance of the flow, producing that excessive pressure which is so injurious to the sensibility of the retina. Considering treatment, he urges that the drug method of controlling glaucoma is at best only a temporary expedient, and its exclusive use justified only in people so old that their expectation of life is less than the period of effective action of the drug. As de Wecker said, "If miotic drugs have never cured a case of glaucoma, they have prevented many glaucoma patients from being cured." Next he shows how vascular changes induce cataract, and explains the risks of growths in the eye, not only to the eye but to the body generally.

He sums up thus: To save eyesight after mid-life, remember: (1) That periodic examination by an oculist is necessary, because of the insidious onset of degenerative disease of the eyes. (2) That cataract may be part of a process, not limited to the crystalline lens, but heralding the presence of a more deep-seated and serious disease of the eye. (3) That blindness from glaucoma, which at present amounts to one-third of all blindness arising after mid-life, can usually be held in check if the patient will only co-operate with his oculist.

The little book is well done, and would be a useful gift to one wavering as to what course to take when the existence of glaucoma is known. We think the author might have made some note on the benefit which proper reading glasses bestow on old folk, but perhaps he thought that so well known as to be self-evident.

[5] *The Modern Treatment of Varices.* The Treatment and Cure of Varicose Affections by the Simultaneous Use of Sclerosing Injections and Adhesive Bandaging. By Dr. Louis Humbert. Translated by Dr. Th. C. Merrill. Paris: La Revue Médicale Universelle. 1927. (4¾ × 7; pp. 93.)

[6] *The Psychology of Murder.* By Andreas Bjerre, Doctor of Laws. Translated from the Swedish by E. Classen, M.A., Ph.D., M.R.S.L. London and New York: Longmans, Green and Co., Ltd. 1927. (Demy 8vo, pp. xi + 164. 9s. net.)

[7] *Saving Eyesight after Mid-Life.* Harvard Health Talks, 14. By J. Herbert Waite, M.D., S.M. Cambridge, Mass.: Harvard University Press; London: Milford, Oxford University Press. 1927. (Fcap. 8vo, pp. 48; illustrated. 4s. 6d. net.)

NOTES ON BOOKS.

PROFESSOR M. R. DRENNAN of the University of Capetown has published a small book of forty pages entitled *A Short Course on Human Embryology* which will be found useful by teachers of that subject in this country and by students. It is the course which is given in the University to medical students, and may be taken as a good example of the kind of course which may be introduced into the already somewhat crowded syllabus of anatomy. It has the special merit of presenting the complicated subject of human development in a manner that is at once very concise and yet readable and interesting, and the material is arranged under headings following one another in a natural order of sequence which greatly facilitates the comprehension of the whole. The descriptions also are excellent—full of essential detail and free from redundancy. The student can use this small work as a stand-by and first textbook of the subject, giving him a good grounding from which he may proceed to the study of larger and more detailed works. As a companion to the short course the author has published a pamphlet of sixteen pages of *Illustrations for a Short Course on Human Embryology*. This consists of photographs and diagrams designed to illustrate the descriptions. Figures of this kind are usually incorporated in the text, but there is a certain advantage in having them separate and arranged in serial order, so that the stages of development can also be followed pictorially apart from the text. The two booklets are published by the author, from whom they may be obtained, the price for the two being 5s.

Antigénothérapie de la Tuberculose[a] is an account by Drs. NÈGRE and BOQUET of their researches at the Institut Pasteur for the production of an antigen for tuberculosis, and of the results of its use in man and animals. The authors found that an extract in methyl alcohol of tubercle bacilli previously treated with acetone formed a very sensitive antigen of fixed stability. When freed from the methyl alcohol, suspended in normal saline solution, and injected into healthy animals, the extract produced antibodies, which were considerably increased if the extract was injected into animals infected with tuberculosis. In tuberculous guinea-pigs and rabbits the evolution of the disease was retarded—it did not tend to become generalized; often it remained localized in a single organ, and after a treatment of several months' duration a process of sclerosis set in. Similarly in man many mucous, glandular, osseous, articular, and peritoneal lesions retrogressed or disappeared entirely, though in some cases the extract failed to act. Drs. Nègre and Boquet are not able to write with so much certainty about pulmonary cases, but they state that several clinicians have observed improvement of the general health, a lowering of temperature, a diminution of sputum, and an improvement in auscultatory signs. There is a preface to the book by Professor Calmette, who is of opinion that antigenotherapy should take a place of greater and greater importance in the treatment of tuberculous diseases, especially if they are afebrile.

[a] *Antigénothérapie de la Tuberculose.* Par L. Nègre et A. Boquet. Préface du Pr. A. Calmette. Paris: Masson et Cie. 1927. (5½ × 7¾, pp. 158; 2 plates. 16 fr. sans majoration.)

PREPARATIONS AND APPLIANCES.

Maxillary Antrum Rasps.

MR. ALBAN EVANS, surgeon to the Ear, Nose, and Throat Department of the Swansea General Hospital, has devised two rasps, forward and backward cutting respectively, which he has found most useful for opening up the maxillary antrum beneath the inferior turbinate bone in cases of empyema. The first is a modification of Dr. Watson-Williams's instrument for the intranasal operation on the frontal sinus. In both due consideration has been given to the angles between the inner wall of the antrum and the anterior and posterior boundaries. The rasps, as shown in the illustration, were made by Messrs. Mayer and Phelps, 59, New Cavendish Street, W.1, several years ago, and Mr. Evans states that they have been used in a great number of cases with satisfactory results.

A MEDICAL REVIEW OF SOVIET RUSSIA.

VI.—WORK OF PAVLOV AND OTHER SCIENTISTS.*

BY

W. HORSLEY GANTT, B.Sc., M.D.VIRGINIA.

(Formerly Chief of the Medical Division of the American Relief Administration, Leningrad Unit.)

PART II.—ORBELI, SPERANSKY, AND OTHER INVESTIGATORS.

ORBELI'S WORK ON THE SYMPATHETIC NERVOUS SYSTEM.

THE work of Professor Orbeli is entirely independent of that of the Pavlov laboratory, but he is one of Pavlov's oldest pupils, and Professor Pavlov told me that he considered his work extremely important. A description of some of Orbeli's work was given in the BRITISH MEDICAL JOURNAL of September 20th, 1924 (p. 533). He has been kind enough to give me a summary of all he has done since and to demonstrate his new work to me. The following account is founded on what I have seen and the written account Professor Orbeli has given me. Part of this has been published in Russian and part is as yet unpublished.

Langley supposed that the autonomic nervous system has no influence on skeletal muscle. Orbeli, in an article in the jubilee volume presented to Pavlov, says:

"In the last twelve to fourteen years this point of view about the sympathetic nervous system has been subject to doubt and revision. On the one hand the histological findings in a series of motor end-plates, nerve endings of the second order, more delicate and finer plates connected with unmedullated fibres, indicated on the basis of regeneration experiments that they were sympathetic; on the other hand, physiologists have recorded various experiments explaining the sympathetic innervation of skeletal muscle. . . . A few years ago, unaware of the anatomical experiments of Boecke and Aghdur and the accompanying physiological investigations, I, on the basis of a number of considerations, suggested that the sympathetic nervous system is truly universal, and must have a direct influence on skeletal muscle, as on all other systems in the organism, and that this effect might be expressed with such variations in the properties of muscle as first described by Pavlov and Gaskell for heart muscle, and later detailed by Englemann under the terms bathmotropic, inotropic, dromotropic, and tonotropic."

From experiments by Ginetzinsky on the frog, Orbeli is led to conclude that the sympathetic nervous system has two antagonistic influences, and that a certain relation exists between the functional disturbances produced by irritation of the sympathetic and the chemical processes which underlie muscular rigidity. In poisoning with chloral hydrate, following stimulation of the sympathetic tonic contractions supervene, beginning after a long latent period, and continuing as an after-effect. Apparently we have to do here with an easily reversible form of those changes which, if of greater intensity, lead to muscular rigor (Strelzoff).

The electrical conductivity of resting muscle and muscle fatigued by tetanizing was compared by Lebedinsky. The recovery of the tetanized muscle was hastened by stimulation of the sympathetic. Tetanization lessened the resistance of the muscle to the electric current, but in the majority of cases the stimulation of the sympathetic accelerated the return to the normal.

Orbeli and Fiedelholz have investigated the "pseudomotor" or "tonomotor" effect of the lingual nerve on the musculature of the tongue. Opposing explanations of this have been given by Van Rynberk and by Frank. The hypoglossal nerve was cut about two weeks previous to the experiment to give the fibres time to degenerate. By trying the effect of stimulation of the lingual nerve at various periods after its section, the pseudomotor and the vascular phenomena can be independently elicited. From this it may be concluded that the tonomotor and vasodilator effects are to be assigned to different nerve fibres. Adrenaline was injected intravenously to reinforce the action of the sympathetic on the tonomotor influence. In these experiments the effect of the lingual stimulation

* Part I of Section VI of this series was published in the JOURNAL of June 11th, 1927, at page 1070.

was indisputably strengthened and was especially marked when the lingual fibres began to degenerate. The results obtained are in full agreement with the behaviour of the sympathetic in other forms of motor innervation.

Ginetzinsky, in Orbeli's laboratory, repeated the experiments of Else on the frog, with certain modifications designed to give more definite results. Ginetzinsky eliminated the influence of the afferent nerves, and showed that the sympathetic alone was responsible for the effect. Both suprarenals were removed and the sympathetic chain was cut on one side. The muscles which had been deprived of the sympathetic innervation were more quickly exhausted and the height of the contraction was less.

In June, 1925, Dr. Tonkich reported from the Orbeli laboratory the effect upon spinal reflexes of experiments on the sympathetic. By stimulation of the lower end of the sympathetic trunk an inhibition or augmentation of the spinal reflexes was produced and paralysis followed. This was analogous to the ascending paralyses which Professor Pavlov had at first described as an accidental result of the operations, but which he later attributed to the presence of trophic nerves. He stated in 1920 that the existence of such trophic nerves had been proved only in the case of the heart, but that they might be supposed to exist for other organs, to exert a definite and final control over the metabolism and the mechanical processes occurring in the various tissues. It thus appears that the experimental work of Orbeli may give an actual foundation to the hypothesis of Professor Pavlov in regard to trophic innervation. Orbeli summarizes his work as follows:

"The sympathetic nervous system exerts a profound influence over the chemico-physical changes occurring in skeletal muscle, accompanied by a modification of its functional ability. These changes influence, it seems, the conditions of the motor end-plate, call forth changes in the efficiency of the corresponding muscles, and form a sort of regulatory mechanism for the expenditure of muscle strength and govern the conduction of impulses by the motor nerves. From this point of view the sympathetic innervation of skeletal muscle is an adaptive innervation through which the functional ability of the muscle is determined."

Other New Work of Orbeli.

Further experiments from Orbeli's laboratory show that the efferent sympathetic fibres have a direct influence on the central part of the spinal reflex arc. The work was carried out on completely bled frogs from which all the viscera and the heart had been removed.

After demonstrating the direct effect of the efferent sympathetic fibres on the central part of the reflex arc of spinal reflexes, there arose the question of a possible influence of the central part of the sympathetic system on the spinal reflexes. To solve this problem Tonkich made an experiment by Setchinov's inhibition method—the stimulation of the optic thalamus with sodium chloride, on the assumption that the centre of the whole sympathetic system lies in the subthalamic region. Orbeli concludes from these experiments that in this case there is no direct reciprocity between different parts of the central nervous system, but that there is a regulating activity of one part of the central nervous system by others through the sympathetic.

Experiments of Ginetzinsky performed in an atmosphere of hydrogen prove that the effect provoked in skeletal muscle by stimulation of the sympathetic cannot be explained exclusively by the augmentation of the oxidation of the products of metabolism. Other experiments demonstrated that the effect of the sympathetic in skeletal muscle occurs in that place where the stimulus from the nervous tissue is transferred to the muscular—that is, in the peripheral apparatus of the motor nerve.

Experiments on dogs showed that when the left abdominal sympathetic trunk was resected the thresholds of stimulation on the two sides differed; this lends support to the hypothesis of Orbeli that the sympathetic contains regulating fibres for the motor as well as for the sensory end apparatus.*

* For details of these last experiments see W. H. Gantt, Work of Pavlov's School, *Arch. of Neurology and Psychiatry*, Chicago, April, 1927. For a full bibliography concerning the sympathetic and muscle tonus, consult Stanley Cobb, Review on the Tonus of Skeletal Muscle, *Physiological Reviews*, October, 1925, p 519.

Cerebral Pathology.

Much interest has been aroused by the researches of Dr. A. D. Speransky, formerly a surgeon, conducted in his own laboratory, as well as in Pavlov's. He produced an auto-neurotoxin giving rise to epileptic convulsions and death in dogs by freezing a small part of the brain. Immunization against the symptoms of freezing has been partly successful by freezing the brain gradually in increasing doses. If the frozen brain emulsion from a dying animal was injected subdurally in a healthy dog it could resist larger doses of freezing. Recently he has been concerned with the pathology of the cerebro-spinal fluid in encephalitis. He says (personal communication):

"In local disease of the nervous system a destruction of the brain substance occurs in the affected parts. The products of destruction are transported into the cerebro-spinal fluid and through it poison the brain. In such a way local disease becomes general, and to this mechanism is due the development of diffuse encephalitis.

"The greatest quantity of the cerebro-spinal fluid comes into relation with the brain substance in the region of the ventricles. . . . This is why subcortical destruction often occurs earlier than cortical. The structural changes in the brain and the clinical symptoms in all toxic encephalitis, as tetanus, hydrophobia, diphtheria, epidemic encephalitis, toxic encephalitis from freezing the brain cortex, have many things in common. In all of these the parts of the brain lying in the vicinity of the ventricles are affected; in all are observed changes in the cornu ammonis; in all there is an infiltration of the shallow parts of the brain substance near the ependyma. The internal brain substance in nearly all of these cases has an infiltration in a circle of cells, not around the blood vessels as was formerly supposed, but around their adventitious sheaths filled with cerebro-spinal fluid."

Speransky, during the summer of 1926, devised an operation to isolate for study small sections of the subarachnoid and subdural spaces without disturbing the rest, in a way somewhat analogous to that by which Pavlov isolated a miniature stomach for collection of the gastric secretion. His recent work with the cerebro-spinal fluid has led Speransky to form the following conclusions as to the haemato-encephalic barrier: its site is uncertain, but it is known that substances in the blood do not occur in the cerebro-spinal fluid. Although ordinarily it has a defensive action, in pathological conditions it may have an undesirable action. Thus some toxins, as that of tetanus, are not arrested by this barrier, but the antibodies and specific serums are. The toxins which reach the brain are fixed there and are not eliminated, but the antitoxins are quickly destroyed, and their return to the blood is prevented by this barrier. The introduction of specific antibodies in the subdural and subarachnoid spaces does not ensure penetration into the brain. His results with rabies, diphtheria, tetanus, dysentery, scarlatina, measles, and meningitis are as follows.

Rabies.—Speransky says that rabies is a disease of the brain only, and can be treated by passive or active immunization.* Ordinarily antirabic serum injected into the subarachnoid space cannot penetrate to the interior of the brain, but if hyperaemia is produced artificially by removing all the cerebro-spinal fluid penetration begins. Under such conditions the action of the antirabic serum is specific—the same *in vivo* as *in vitro*, because it comes into contact with the virus. Subdural injection is efficacious clinically, whereas intravenous is not, because of the haemato-encephalic barrier. Speransky has overcome this obstacle by withdrawing cerebro-spinal fluid at the same time as the injection is made. He considers that the veins of the cranium and of the brain substance are complementary, and that the pressure in the latter is dependent upon the pressure of the surroundings. He was led to this view by observing that there was no bleeding during trephining if the cerebro-spinal fluid had been withdrawn, and that after removing a large amount of cerebro-spinal fluid the next portion, instead of being colourless, was yellow. Antirabic serum was injected into the ear veins of twenty rabbits, and then in ten of them 1 to 1.6 c.cm. of cerebro-spinal fluid was removed by aspiration and reinjected several times before final removal. After one to two hours the brains of all twenty were inoculated with

* *Annales de l'Institut Pasteur*, 1927.

the virus of rabies. Those in which the cerebro-spinal fluid had been removed remained healthy, while all the others developed rabies. This process of aspiration and reinjection I shall refer to as re-aspiration.

Diphtheria.—Eighteen pairs of rabbits were injected with diphtheria toxin, and, after an hour, with antitoxin. The 18 controls died on the third day. In the other 18 the cerebro-spinal fluid was aspirated and reinjected five to ten minutes after the antitoxin. Five of these remained healthy, 11 outlived the controls by three to five days, and 2 died at the same time as the controls; but when the re-aspiration was done, not one hour, but forty-five minutes after the injection, all the animals survived.

Tetanus.—Re-aspiration lengthened the life of the animals, but did not prevent death, owing, as Speransky believes, to the early fixation of the tetanus toxin in the brain. Six clinical cases of tetanus have been treated by re-aspiration. The antitetanus serum was introduced in five cases intraspinally after withdrawal of 40 to 110 c.cm. of cerebro-spinal fluid, which amount can be aspirated under narcosis without unfavourable results. The operation was repeated after one to two hours and was done four or five times. Five of the cases recovered gradually, but in the sixth no fluid was obtained, and owing to this failure to produce hyperaemia by aspiration death occurred.

Dysentery also was treated by this method. In animals which had already developed diarrhoea and paralysis the best results were obtained by simultaneous injection in the blood and in the cerebro-spinal canal; in no case did intravenous injection alone produce a cure. Although the union of the dysenteric toxin with the brain substance does not appear to be so stable as that of other toxins, Speransky concludes that the penetration of the specific antibodies into the central nervous system is necessary for the serum to produce its curative action. He suggests also that the difference between the action *in vitro* and *in vivo* of many other serums (anticholera, etc.) is due to the failure of contact between virus and serum. Antidiphtherial serum has nearly the same effect, whether it is introduced subcutaneously, intramuscularly, or intravenously, because diphtherial toxin can destroy the barrier; it "leaves the gate open," while all other toxins which pass this barrier "close the gate behind them," so that antibodies cannot enter.

Scarlatina.—Eight grave cases were treated by aspirating 15 to 20 c.cm. of cerebro-spinal fluid and injecting 4 to 10 c.cm. of serum;* five of these completely recovered (disappearance of fever, exanthem, and symptoms); in two there was an incomplete effect, and in one there was no effect. Injection of the same amount subcutaneously into the blood or muscles was without effect, although the use of 100 to 200 c.cm. by these routes is effective. The best results were obtained by simultaneous introduction on both sides of the barrier.

Meningitis.—Speransky's method of re-aspiration led, in four grave clinical cases of acute epidemic meningitis, to recovery commencing simultaneously with the procedure. Re-aspiration was repeated every two to four hours, and 10 to 20 c.cm. of fluid was withdrawn.

Speransky holds that the appearance of "general" symptoms of a disease indicates penetration into the central nervous system, and that many local lesions are due to an affection of the corresponding parts of the central nervous system. The rapid oscillation of pressure caused by re-aspiration changes the circulation in the blood vessels of the brain to such an extent as to permit antibodies in the blood to pass through. Although Speransky has never seen any disastrous effects from the use of this method, he says that his clinical material is too small to draw a conclusion, and he cautions against its indiscriminate use, since it may be very dangerous to remove too much cerebro-spinal fluid in some cases.

PREVENTION OF NEURO-MUSCULAR FATIGUE.

Professor A. A. Bogomoletz of the Second University of Moscow, who has made many contributions to contemporary Russian pathology, recently called attention to the importance of the mesenchyme in determining constitutional types; a healthy reticulo-endothelial system is, he states, the best protection against cancer; and this he has substantiated by preventing the development of experimental cancer through the use of a cyto-stimulant of the reticulo-endothelial system.

In 1925 he reported that neuro-muscular fatigue in horses can be lessened by the administration of sugar. This received practical confirmation during the Moscow races of 1926, when a horse which had always lagged behind was treated by Professor Bogomoletz, with the result that it won first place and the professor the prize of 30,000 roubles given by the Government for scientific research.

Chemical examinations of the blood of race-horses showed that the variations were constant in each individual. Three groups were distinguished: (1) those with normal content of blood sugar; (2) those with hyperglycaemia; (3) those with hypoglycaemia. The latter were found quickly to become fatigued, and to show slight hyperglycaemia after the race. The administration of 500 to 1,000 grams of sucrose daily increased the blood sugar, and simultaneously bettered the horses' racing time and diminished the subsequent fatigue. Professor Bogomoletz has informed me that in some horses which could not even finish the course he succeeded, by changing the diet on the basis of the blood analyses, in improving their general condition to such an extent that they often won first place. On the other hand, the administration of sugar to those of the first group often caused a reduction of the blood sugar, which is explained by Professor Bogomoletz as due to a probable interference with the function of the islands of Langerhans.

The amount of phosphorus in the blood after racing showed an increase parallel with the hyperglycaemia. It is possible, according to Bogomoletz, that we have here an automatic chemical regulation of the production and destruction of lactacidogen, and that phosphoric acid (H_3PO_4) quickens the breaking up of glycogen. It was found in large quantities in fatigued isolated muscle.

The increase in the concentration of K-ions and the reduction of those of Ca formerly observed in athletes was found also in horses during the races. Bogomoletz considers this to be an important factor in fatigue. The prevention of fatigue should have regard not only to the above facts, but also to the aeration of the blood before exercise by thorough ventilation and the administration of oxygen.

CANCER.

Several methods of treating cancer have been tried in Russia since the revolution. Besides the Molotkov method, which has been published, and which consists in cutting the sympathetic nerves in the cancerous area, Dr. Spasokukotzsky, professor of surgery in the University of Moscow, is trying a procedure based on the researches of Lintvarev of Saratov. Spasokukotzsky has not published his results, as he does not wish to be swamped with useless requests from patients, but he has given me the following verbal account for this JOURNAL:

"Lintvarev has shown that in disease the red blood cells contain a larger percentage of toxins than the blood serum. We have treated three cases of inoperable cancer by reinjecting them with their own blood cells. About 40 c.cm. of blood are withdrawn from the patient; the red blood cells are separated and washed and then injected subcutaneously. There is no reaction (rise of temperature, chill, or convulsion) whatever, although severe symptoms are observed if the blood serum is injected. The first case was an inoperable cancer of the breast. A year ago we gave her ten injections of her own red blood cells, and she is still living, and even better, although untreated she would surely have been dead; she now has freer use of her arm and the cancer is smaller. The second patient, who had cancer of the oesophagus, a condition usually rapidly progressive and fatal, received three injections; the course of the disease has apparently been arrested as the patient is no worse. The third case (inoperable cancer of the breast) was almost cured by our injections, but when we endeavoured to hasten the treatment by using for injection the red blood cells of another cachectic cancer patient she became rapidly worse. This method of treatment, the auto-injection of washed erythrocytes, has given excellent results in

*The Russian serum is considerably weaker than the product of Parke Davis.

cases of surgical tuberculosis, especially in tuberculous peritonitis. Rapid improvement has followed in every case in which we have tried it."

A. A. Bogomoletz has retarded the growth of cancer in mice in the following way: The spleen, bone marrow, and omentum (tissues rich in reticulo-endothelial cells) of mice were macerated and made into an emulsion. This was then injected into a number of rabbits, four or five injections at intervals of five days. After a month the blood of the rabbits might be expected to contain antibodies for the reticulo-endothelial cells of the mouse—haemolysins, agglutinins, etc. To see which rabbits had actually developed these anticytotoxic bodies they were tested by the Bordet-Gengou method. Small doses of this rabbit serum were found to stimulate, and large doses to depress or "block," the reticulo-endothelial system of the mouse. A batch of over 500 mice was divided into three groups. All the groups were subcutaneously injected with cancer cells from other mice. Group I was used for control; 50 per cent. of them developed cancer. Group II was injected with *small* (therefore stimulatory) doses of the rabbit serum containing the anticytotoxic bodies for the reticulo-endothelial cells of the mouse; only 10 per cent. developed cancer. Group III was injected with *large* (therefore depressing) doses of the same rabbit serum, and 70 per cent. developed cancer. These data support Bogomoletz's theory that the growth of cancer is dependent upon the health of the reticulo-endothelial system.*

WORK OF CHALATOV.

By transplantation of the testicles of young cats to very old ones and ligating the vas deferens at the same time, Chalatov obtained a growth of new incisor teeth in three cats, 12 to 14 years old. His further studies with cholesterol show that in starvation the blood cholesterol is diminished, but that it rises again just before death. Removal of the thyroids caused a diminution, but extirpation of the kidneys or parathyroids a great increase of blood cholesterol (Nekludov). Resistance of the red blood cells was found (Frankel) to be less in the hepatic than in the peripheral veins, a fact which he considers in favour of the view that haemoclastic function resides in the liver rather than in the spleen, as formerly thought.

DIGESTION.

Effect of Mineral Waters on the Gastro-intestinal Tract.

The Caucasian mineral waters, taken with food, markedly augment the secretion of gastric juice and shorten the whole period of digestion. The same waters taken half an hour to an hour and a half after food have an inhibitory effect on the secretion of the stomach, due to the water having passed into the duodenum, where it acts when food is taken into the stomach. These waters do not increase the secretion of the bile, but it seems that they hasten its expulsion from the gall bladder into the duodenum (Fursikov, Martinson, et al.). All these waters contain calcium, magnesium, iron, sodium, and free carbon dioxide; some are radio-active.

Effect of Vegetable Juices on Gastric Secretion.

In 1917 it was shown in Pavlov's laboratory by Volborth and others that vegetable juices have a great effect on the secretory action of the stomach. K. M. Bykoff found that vegetable juices taken with meat and other proteins greatly increase the flow of gastric fluid. This was held to afford a scientific basis for the use of the soups made of meat and vegetables which are so popular in Russia. When vegetable juices were taken with carbohydrates the flow was also greatly increased. Bykoff found also that during the first hour fatty foods inhibit the action of the gastric glands, but that if given with vegetable juices the inhibitory phase of the fat completely disappears, and the total quantity of the stomach juice for the whole period is much greater than with fat alone. This experiment explains the use of fatty foods and vegetables together—for example, butter and cooked apples together give a great flow of stomach juice. From the secretory effect and from the composition of their ferments, vegetable juices must be considered as energetic stimulators. The work was done on dogs with pouches isolated according to the method of Heidenhain and Pavlov.

Later studies showed that tomato juice was the strongest of all known natural stimulators of the gastric secretion, including even meat extracts. During the two and a half hours after giving 250 c.cm., 16.3 c.cm. of gastric secretion were obtained from the little stomach of the dog; 200 c.cm. of distilled water gave during the same time only 1½ c.cm., and 250 c.cm. of cabbage juice 8 c.cm. The juice of cauliflower caused a secretion somewhat larger than that of cabbage; watermelon juice, two or three times greater than distilled water; the juice of cherries and grapes produced the same amount of secretion as distilled water. The simultaneous administration of 250 c.cm. of tomato juice and 250 c.cm. of warm mineral water ("narzan," similar to apollinaris) called forth a much larger secretion than even the tomato juice alone. When mineral water was added to watermelon juice the secretion was greatly increased. When vegetables and mineral water were given together the combination produced more secretion than either alone.

CONCLUSION OF THE SERIES.

In concluding this series of articles I desire to reiterate my point of view—that is, I have had no political end to serve, and I have had nothing to prove. My original idea was to present the general medical and scientific facts that I had collected in Russia, in order to give information on an important subject, and at the same time to balance these facts so that the whole series of articles would convey to the careful reader an accurate conception of the situation. The perusal of isolated passages will not, I think, produce a correct impression of the events.

The following conclusions can, I think, be safely drawn. There has been in Russia, from the medical point of view, a truly appalling calamity—intense suffering, indescribable horrors of severe famine, wholesale ravages of disease, extreme general poverty, and bestial conditions of living. Although the effects of this will continue for a long time, the acute stage is passed, and is being followed by one of slow but gradual reconstruction. The disaster was probably due in the main to the accompanying disorder and prolonged deprivations of continued war and revolutions in an already demoralized country. The sweeping political changes came at a time unfavourable for the experiment, and it is therefore more difficult to judge accurately of their effects than of those of the war on disease during this destructive period; but it can be seen that they have already initiated profound general mutations, the full force of which will not be manifested perhaps for a generation—such as, for example, the difference in moral standards and education, the substitution of community and club life for that of the family, and so on.

As the period of destruction has been the most prominent and has had its acute crisis I have devoted more space to it than to that of the subsequent reconstruction, which is only just beginning and is occurring along various lines. Although I have included some recent scientific achievements, these, though given official encouragement, have been mostly in the nature of individual efforts. I intend to treat in more detail later on this stage of reconstruction.

I desire to express my gratitude to Sir Dawson Williams for his consideration in having first helped me with the outline of the material I had collected. To Dr. J. W. McNee I am indebted for suggestions about the present article; and to S. G. Kiryanova and I. Guerbatch for assistance in the preparation of material from the Russian.

Note.—In order to avoid any confusion that might arise from the reference to Pavlov's two books in the footnote to my article published in the BRITISH MEDICAL JOURNAL of June 11th, 1927 (p. 1070) I desire to say that the volume there mentioned as *Activity of the Cerebral Hemispheres* is that published by the Oxford Press in July, 1927, under the title *Conditioned Reflexes*, while the one called *Conditioned Reflexes* in my article is another book, which has not yet appeared in English.

* Personal communication of unpublished work.

British Medical Journal.

SATURDAY, OCTOBER 22ND, 1927.

HARVEY, BACON, AND GILBERT.

The Harveian Oration, which dates from 1656 and has now been delivered on 208 occasions, has often made the distinguished holders of this high office feel that they are faced with the recitation of an oft-told tale, and that the exertions of their predecessors have left them few, if any, new avenues of approach to Harvey's discovery. It is of course true that in founding it Harvey left certain directions, such as a commemoration of all benefactors by name, and an exhortation to the Fellows and Members to " search and study out the secrets of Nature by way of experiment "; but these have been so dutifully followed, especially with regard to the commemoration of benefactors—for example, by the late Sir Norman Moore in his Oration (1901)—that recent orators have sometimes been constrained to go rather far afield and to content themselves by references here and there to Harvey's inspiring example and experimental methods. Sir William Hale-White, in his Harveian Oration this year (p. 713), has taken as his thesis one which, at any rate for many years, has not been attempted by his predecessors—namely, the influence exerted on Harvey by his senior contemporaries in this country, Francis Bacon (1561-1626), Lord Chancellor and philosopher, and William Gilbert (1540-1603), President of the Royal College of Physicians (1600), and " the Father of experimental philosophy in this country," whose *De Magnete, Magneticisque Corporibus et de magno Magnete Tellure, Physiologia nova* (1600), declaring the earth to be a magnet, was the first great scientific book published in England.

As Harvey was in Padua from 1600 to 1603 it has naturally been assumed that he was stimulated there by the Italian atmosphere to research on experimental lines. In a lecture at the Royal Institution on Harvey on January 25th, 1878, the year in which the tercentenary of Harvey's birth was celebrated in London, the late Professor T. H. Huxley considered the question whether or not Bacon had influenced Harvey's mind and method of investigation, and very definitely decided against this possibility on the grounds that there is not any trace in Harvey's works of Bacon's writings, and that Bacon's *Novum Organum* (1620) was not published until some years after Harvey had given his demonstration of the circulation of the blood in his Lumleian Lecture on April 17th, 1616, at the Royal College of Physicians, the setting of which Sir William Osler so graphically painted in his Harveian Oration twenty years ago. With a wealth of argument and quotation Sir William Hale-White contends that there is much circumstantial evidence, though admittedly not any direct proof, of Bacon's influence on Harvey. In so doing he brings out his sincere admiration for both the matter and the manner of Bacon's writings, and incidentally throws some interesting light on Bacon's personality, his introspection, and sufferings from the gout and the stone, thus recalling Sydenham's afflictions and Erasmus's epigram: " I have renal colic, you have gout; we have married sisters."

Stress is skilfully laid on the probability that Harvey had read and was influenced by Bacon's *Advancement of Learning*, which came out in 1605, before Harvey had started on his experimental investigation of the circulation, and that it inculcated the experimental method which Harvey later practised with such efficiency and excellent results. Sir William Hale-White meets the objection, raised by Huxley and reiterated in a leading article in our columns a year ago (1926, ii, 311), that as the *Novum Organum* was published in 1620 Harvey could not have been influenced and stimulated by it in his methods of investigation; he points out that while engaged in his writings Bacon freely discussed their substance, certainly with his chaplain and probably with his medical attendants, of whom Harvey was one, though it is not claimed that Bacon utilized Harvey's professional services before the delivery of the Lumleian Lectures of April, 1616, when Harvey first demonstrated his discovery; it is argued that it does not follow that the contents were unknown until the masterpiece was printed. Later on, however, the orator explained the absence of any reference by Bacon to Harvey's discovery by the death of the fallen Lord Chancellor in 1626, before the publication of the *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* in 1628; so by parity of reasoning it might be suggested that Harvey, his physician, had verbally told him some details of a matter of such absorbing scientific interest. From consideration of Harvey's writings Sir William Hale-White infers that, except for the grandeur of Bacon's language, Harvey's opinions might well have been expressed by Bacon, and that the minds of these two outstanding men of their time ran on similar lines, so that they thought alike. The evidence adduced from the remark quoted by John Aubrey, who as a gossip has been described as "a kind of immature Boswell," to show that Harvey was not influenced by Bacon is criticized with much ingenuity and effect.

Turning to the question of the influence exerted by William Gilbert on Harvey, the orator makes it abundantly clear that as a friend of Dr. Lancelot Browne, whose daughter Elizabeth became Harvey's wife in November, 1604, Gilbert must have been well known to Harvey by repute, though perhaps not in person (for he died in 1603), as a leader in medicine as well as in science and the author of his great work, which burst upon the world just when Harvey was in a particularly receptive state of mind and full of energy for his future life of epoch-making research. This interesting and closely documented Oration, a labour of love and dictated by respect for " the father of modern physiology," closes with a brief sketch of the scientific atmosphere in the early years of the seventeenth century, which leads up to the conclusion that Harvey must have been familiar with the teaching of Gilbert and Bacon.

THE SEROTHERAPY OF POLIOMYELITIS.

Professor G. Etienne of Nancy has devoted much attention during recent years to the subject of poliomyelitis and its treatment by serotherapy. The use of convalescent serum was suggested so long ago as 1910 by A. Netter, and subsequent investigations have shown that this procedure is efficacious in certain cases. Professor Etienne has now published, in the issue of the *Revue Médicale de la Suisse Romande* for August 25th, a careful summary of what is known about myelitis and its treatment. He prefers the term " myelitis " to the more classical one of " poliomyelitis," because

in the adult, with whom he has been mainly concerned, the infective process is more diffuse than in the infant, in whom myelitis is limited more definitely to the anterior cornua. In his present contribution he draws attention to the striking analogy between the clinical evolution of anterior poliomyelitis and that of paralytic rabies. Research along the lines of Pasteur's classic study of rabies has established experimentally the specific action of the virus of anterior poliomyelitis on the nerve centres, the filterability of the virus, its biological characters, its extension along the nerve trunks, the possibility of its transmission to monkeys and of immunizing them by successive doses of virus, and the neutralizing power conferred on the blood of these animals. Monkeys may be inoculated by intraperitoneal, intradural, subcutaneous, intravenous, or intra-intestinal injection, also by the nasal route. It appears that the virus is eliminated by the pharyngeal mucosa and the tonsils. This is an important point, in view of the fact that myelitis may follow coryza or sore throat, and that "carriers" may constitute a danger in epidemics. Although the infective agent has not been definitely isolated, it has been shown that the blood of apes which have survived an attack of paralysis can neutralize the virus, and that the serum of convalescent patients has the same power, provided that the injections of serum have been commenced within eighteen or twenty-four hours of infection.

Professor Etienne describes the application of serotherapy in three periods of the infection: in the initial pre-paralytic phase, in the stage of extensive paralysis, and in that in which the palsies have become established. Several observers have found that the majority of patients who are treated with the serum of convalescents during the first phase do not develop paralyses to any great extent. When injections are given during the second stage striking results have been reported. In most cases there is definite arrest of the paralytic process, and very often recovery, sometimes rapid, from any existing paralysis. In regard to the third phase, as a rule a good deal of the paralysis clears up, leaving a residuum that is usually permanent; it is thought that in cases treated with serum recovery is more rapid and more complete, but it is obviously necessary to intervene before definite destruction of medullary cells has occurred. As in all forms of serotherapy, treatment must be undertaken at the earliest possible moment. Since the quantity of serum available for injection is necessarily very small, it is advisable to inject it by the intrathecal route, which also favours acceleration of the response. The quantity injected ranges between 3 c.cm. and 13 c.cm.; with larger doses meningeal symptoms, such as opisthotonos, frequently occur. Netter recommends the repetition of injections (generally about eight times), but this appears to intensify the meningeal reactions.

On account of the difficulty in obtaining sufficient quantities of the serum of convalescents, many attempts to immunize animals have been made, chiefly at the Pasteur Institute in Paris. Etienne records nine cases of complete recovery after repeated intrathecal injections of serum prepared at the Institute. In one case (a man aged 40) treatment was only commenced seven weeks after the onset of the disease, when he was completely paraplegic with considerable muscular atrophy; an important clinical point is that the fever persisted. In ten days 120 c.cm. of serum was injected, and within eight days the patient had improved, the reflexes returned, and he began to walk; three weeks later he had recovered completely, except for slight extensor paresis and talipes equinus. One failure is recorded in a man aged 62 who had severe diabetes; he died of heart failure, in spite of definite improvement in the paraplegia. Professor Etienne adds that this serum is not effective in other apparently similar diseases, such as epidemic encephalitis and disseminated sclerosis. Netter's method of employing the serum of convalescents has given generally satisfactory and sometimes remarkable results, and the conclusion is that it has definitely passed out of the experimental stage.

HOSPITAL POLICY AND LEGISLATION.

At the Autumn Dinner of the British Medical Association Mr. Neville Chamberlain, the Minister of Health, made a speech, fully reported in the Supplement for this week, which greatly impressed his audience He outlined the legislation which he hoped would be passed at early dates for assisting the work of his department in furthering national health. Not the least part of the interest excited by his speech was due to his sketch of ideas on hospital policy. These ideas he has since set out in an interview which appeared in most of the daily papers on October 15th. From these sources it appears that the Minister desires to secure three main things in any reform of the Poor Law so far as this will affect hospitals. First, that there shall be association of hospital activities and not competition. This association, he claims, is necessary if the voluntary hospitals and their invaluable associations and the spirit that informs them are not to be lost through pressure by the statutory hospitals, whose resources may be termed (in comparison with the voluntary hospitals) as unlimited.

Such an association would, he suggested, be best brought about by the formation of a joint body embracing both the municipal and voluntary hospitals, which should decide upon the line of development of hospitals, where they were needed, their types, and so forth; and also secure interchanges between the hospitals both as regards patients and staff. Change of control of the Poor Law infirmaries from the smaller statutory boards of guardians to the municipalities he considers necessary, if only to secure the removal of the old stigma of pauperism from these great institutions. It would facilitate also arrangements for the interchange of patients. Such a scheme should make it easier for patients to secure admission to hospital, and for the home doctor to keep in touch with his patient when in hospital. The general practitioner should be represented upon the joint body of control and be in closer touch with institutional treatment.

Further, he envisaged the extension of hospital treatment so that not only the poor who cannot pay will be treated, but those who are able to pay more or less completely for the treatment they need, and those who would be able to pay a full fee both to the hospital and their own specialist whose treatment they desire. "Nobody should be deprived of institutional treatment." Our present system, he holds, is illogical and wasteful; the custom of making differentiation in the treatment of a sick person according to whether he could or could not pay he deems absurd. His proposal to make the Poor Law hospitals into municipal hospitals, he maintains, did not savour of municipal socialism, for it was not a transference of a private hospital to public ownership. Some, he admitted, were suspicious that it meant doing away with the voluntary system, but that was the very opposite of what he wanted to do. His desire was to save the

voluntary hospitals from a danger now overshadowing them.

The British Medical Association has formulated its hospital policy after prolonged deliberation through Council, committees, Divisions, and Representative Body. Now we have a Minister of Health who has shown himself particularly interested in the progress of medicine, and bold enough to lay the outlines of his hospital policy before the public. When we compare these two drafts of policy, the Association's and his, we are grateful to find that there is so large a measure of agreement. There is a happy significance in this fact: a happy augury for the successful accomplishment of a real reform of our hospital system in the near future which shall be both effective and British.

THE HARVEIAN FESTIVAL IN LONDON.

The Harveian Festival was celebrated in London in the usual way by the Royal College of Physicians on St. Luke's Day (October 18th). The Harveian Oration, delivered by Sir William Hale-White, is printed in full in the opening pages of this issue, and elsewhere we make further editorial reference to it. It was delivered in the afternoon, when the Baly Medal was presented to Professor A. V. Hill, F.R.S. At midday the President (Sir John Rose Bradford) and the censors and some members of the Council of the College attended Bow Church, Cheapside, to hear the annual sermon preached under the Sadleir Trust. The preacher was the rector of the church, the Rev. Gordon Ponsonby, and the sermon was principally a recital of the names and achievements of distinguished Fellows of the Royal College who had passed away during the year. Among others whom Mr. Ponsonby recalled to the mind of his hearers were Francis Warner, who laboured on behalf of feeble-minded children; Llewellyn Phillips, a name which Gonville and Caius men remembered with special pride, who spent twenty-five years of his life training medical students in Egypt; Thomas Claye Shaw, who took his first degree in London as long ago as 1860, and was a pioneer in advocating the establishment of mental clinics connected with general hospitals; Sir Isambard Owen, who after twenty years as a physician in London seemed to have found a more congenial sphere of labour in educational administration, where his sympathies had full play; Thomas Robert Bradshaw, a loyal and lovable colleague, who laboured among the hard-headed folk of Lancashire; Ernest Henry Starling, a man of exceptional distinction, who greatly advanced the knowledge of physiology; Sir Bryan Donkin, who made notable contributions to the study of the inheritance of mental characters; Charles Wilberforce Daniels, who, after working in tropical colonies, had served as director of the School of Tropical Medicine; and Adrian Stokes, perhaps the most pathetic of all these losses, who was cut off at the age of 40, though not too soon for him to have exemplified how abundantly he possessed the great virtues of the medical profession—patience, courage, selflessness, humaneness. The preacher also spoke of one, not a Fellow of the College, of whose death he had learned only within the last few days—Sir William Macpherson, a life-long friend of his own, with whom he went to school more than half a century ago. The preacher's own chief recollection of him was of his great tenacity of purpose in all that he undertook. In addition to this he was a humble man at heart, reverent in his thoughts, quiet in his manner, and unwearied in his work; he approached death at the last with the same calm courage he had looked it in the face more than once before in other lands. He and his like, said the preacher, still spoke to those who followed in their steps. He was a wise man who said that the dead ruled the world. Their bodies had been laid in the grave, but their voice was still heard. In the evening a dinner was held within the College. Among the guests were the Dean of Westminster, the Speaker of the House of Commons, the Secretary of State for War, the President of the Royal College of Surgeons, the President of the Royal Academy, and the Masters of the Grocers and the Merchant Taylors Companies. The Speaker and the Secretary for War responded to the toast of "The Guests," and the latter made a very sympathetic reference to the Air Force Medical Service.

TREATMENT OF EARLY MENTAL DISORDERS.

Experience has shown that there is no more urgent problem in the case of patients afflicted with mental disease than the adequate treatment of its early stages. In this we have to some extent lagged behind other countries—especially perhaps Germany and the United States of America—owing partly to the legal difficulties under which we still labour in bringing patients with slight and early mental disorders under control, and partly to the constitution both of our large public mental hospitals and of the smaller registered houses, which are bound either by law or by economic reasons to accept all patients, both early and chronic, who are sent to them. In the larger public institutions a segregation of patients in the early stages of mental disease is sometimes possible and is often attempted, but it is rarely practicable in the smaller mental hospitals and homes. In another column we publish a description of the Reception Block which was opened last week at St. Andrew's Hospital, Northampton. Into it all persons suffering from recent or acute psychoses who are sent to the hospital will be admitted and treated apart from the more chronic cases, until they recover sufficiently to be discharged or pass into a subacute or chronic stage. Here the ideal of the complete separation of patients with recent and often curable conditions from cases of hopeless or long-standing insanity will be possible, since the Reception Block has its own entrance, stands in its own grounds, and is under the care of a separate staff. An equally important feature is the provision of laboratories for the complete investigation of every case admitted to this block. In this matter we have been much behind the facilities enjoyed by psychiatric clinics and mental hospitals of some other countries; in our smaller licensed houses, particularly, the clinico-pathological examination of patients has always been difficult, yet attention is being more and more strongly directed to the etiological importance of physical disease in the pathogenesis of insanity, and especially to disturbance in metabolism and to intoxication from foci of sepsis or other infections. If these factors are as important as some believe, it is obvious that they should be dealt with in the earliest possible stage of the illness. The influence of environment and of various forms of physicotherapy in the early stages of mental disorders has long been recognized in other countries, but in England, though theoretically taken into consideration, there has been no adequate opportunity of making a complete study of its influence on the rate of cure. In the United States valuable work is being done in this connexion, but the St. Andrew's Hospital, Northampton, is, we believe, the first institution in England which has been able to devote a whole block and whole-time medical men to the study of these influences. The difficulties of cure and treatment in mental disease must be very greatly increased when these patients are, of necessity, in the constant company of hopeless and chronic cases. In all other diseases efforts are made to keep the acute and curable cases away from the hopelessly incurable on account of the mental effect produced. It stands to reason that those patients in mental hospitals who present signs of lessened mental confusion must be depressed in their saner moments by close contact

with the wrecks of human civilization. The congratulations of the medical profession are due to the committee and medical staff of St. Andrew's Hospital for this welcome innovation in the treatment and investigation of mental illness. The Board of Control and all those in authority in asylums have been much preoccupied with the low recovery rate in mental disease as compared with other forms of disease, but, as the chairman of the Board of Control said at the opening ceremony, more favourable results may be looked for as a result of the experience gained at Northampton. The Lord Chancellor also laid stress on the desirability of all mental institutions in this country taking steps, so far as in them lies, to establish similar hospitals.

THE TRAFFIC IN DANGEROUS DRUGS.

SEVERAL recent events have directed attention afresh to the traffic in opium and other dangerous drugs and the means which have been invoked with a view to effect both national and international control of that traffic. At the twenty-fourth Interparliamentary Conference, held recently in Paris (August 25th to 30th), a series of resolutions was carried declaring "unanimously" that the abuse of the drugs in question will only be reached by "limitation of the culture of the poppy and coca leaves and of all narcotics to the recognized amount needed for medical and scientific purposes, this measure to include the total suppression of the use of opium for smoking." It is true that later resolutions exhibited signs of compromise between those groups which approved the agreements arrived at by the Geneva Conferences of 1924-25 and those which did not. Thus a period of fifteen years was indicated within which the suppression of opium smoking contemplated by the Hague Convention of 1912 should take effect; and while some groups urged the ratification of the Geneva agreements, others pressed for their revision in accordance with the principle contained in the above-quoted first resolution, which had been passed unanimously. On September 16th the Assembly of the League of Nations received a report from its Fifth Committee dealing with the opium traffic. This report emphasized the insistence of the Advisory Committee on Dangerous Drugs on the necessity for a general vivid apprehension of what the illicit traffic in dangerous drugs means "in terms of human suffering, misery, and degradation," as well as on the committee's serious statement that the action taken by several Governments "falls far short of their contractual obligations" under the Hague Convention of 1912. Attention was called to the fact that Turkey had not yet ratified the last-named treaty, nor vouchsafed a reply to the secretariat's communications on the subject. The Fifth Committee further complained that several Governments had failed to comply with their stipulated undertakings to furnish information in regard to the commerce in noxious drugs of their respective countries. The change in constitution of the Council of the League of Nations has caused a setback in the matter of putting in force the Geneva agreements of 1925. It will be remembered that the effectuation of the Geneva Convention was dependent upon its ratification by ten signatory States, including seven of the principal States represented on the Council, two of which must have permanent seats thereon. By the disappearance of Belgium, Czechoslovakia, and San Salvador from the Council three of the requisite ratifications have been lost, only those of Great Britain, France, and Poland remaining effective. Early this month a special session of the Advisory Committee on Opium, etc., was held at Geneva. Further evidence of the "enormous scale" of the illicit traffic in dangerous drugs was forthcoming, and of its backing by "huge financial resources." Proposals were put forward for placing the manufacture of all dangerous drugs in Governmental hands or for an "international union of alkaloid manufacturers," which, however, were referred to a subcommittee. The committee lamented that only three States, members of the League Council, out of the seven required had ratified the Geneva Convention, and made an "urgent request that the matter shall receive serious consideration at the next meeting of the Council."

A PROPOSED ASTHMA RESEARCH COUNCIL.

WE have received a notice informing us that an Asthma Research Council has been formed with the Earl of Limerick as president, Lord Greenway as vice-president, and Captain F. L. M. Boothby, C.B.E., as honorary secretary. The writers state that according to the Registrar-General's returns more than 2,000 men, women, and children die from asthma and its kindred diseases every year, and they infer that for every sufferer who dies there are many thousands whose lives are made a burden to them by the paroxysms of this malady. They go on to assert that, though palliatives have been found, no certain cure exists, and, further, that the cause of asthma is unknown. The council, they state, has been established to serve as a central body organizing research and carrying it out systematically. Its office is at 12, Bedford Street, W.C.2. Asthma is so distressing and incapacitating a disorder that we can well understand sufferers from it desiring to institute inquiries in the hope of finding some cure, or at least some mitigation, but the investigation of the cause of asthma is a very complicated problem; it is not so much a disease in itself as a symptom of some defect, functional or structural, which may not be, and probably is not, of the same nature in all cases. For this reason we think that the first step the proposed council should take would be to obtain from medical sources the most recent information available as to what has already been done, and of the medical work which is now in progress. For any effective inquiry a team of workers would be necessary, such as can only be found at a general hospital. Were the council able to finance a special asthma out-patient department such as exists in several American cities, and succeed in having it attached to some general hospital, a group of cases could be thoroughly investigated from every point of view. A physician, laryngologist, and radiologist already on the staff and interested in asthma might be put in charge, and some younger man, also if possible interested in the disorder from a pathological point of view, might be appointed to devote his whole time to the work as a research fellow. Such a research fellow would begin by spending some time at Leyden with Professor Storm van Leeuwen, at Mont Dore, at Bad Reicheshall, and at the asthma clinics in Boston, New York, Philadelphia, and at the Mayo institution at Rochester. When he got to work in this country he would need skilled secretarial assistance for the collection and analysis of statistics. Those quoted by the promoters from the Registrar-General's returns are probably fallacious. The 2,000 deaths mentioned must include bronchitis complicated by asthma, and probably also conditions known as cardiac and renal asthma, neither of which has anything to do with real asthma. We should rather doubt whether half a dozen people die on an average in any year from uncomplicated or nervous asthma in England and Wales. A vast mass of statistics can, no doubt, be collected, but unless very carefully digested and examined from all points of view they are not likely to lead to any helpful results.

MALARIA AND NATIONAL DECAY.

CERTAIN letters on malaria and national decay appeared in the *Times*, the writers of which seemed to be unaware that as regards Greece, with which they concerned themselves, it had received almost exhaustive treatment a score of years ago. Mr. W. H. S. Jones of Cambridge published,

in 1907, a small book on *Malaria: A Neglected Factor in the History of Greece and Rome*, and two years later followed up the subject in *Malaria and Greek History*. Both these books were noticed in our pages (BRITISH MEDICAL JOURNAL, 1909, vol. ii, p. 1349). The first work was reissued in 1920 with some additional evidence and an introduction by Sir Ronald Ross, but the great mass of historical facts and references collected by Mr. Jones is to be found in the second book.[1] It is generally accepted that the national character of the Greeks changed for the worse between the fifth and third centuries before Christ, but there is not the same consensus of opinion as to the cause of this change. Mr. Jones and some others attribute it to the prevalence of malaria as a new endemic disease. One of the difficulties in discussing this question is the lack of precise diagnosis and the consequent doubt as to the nature of diseases known by such names as *πυρετός*, *καυσος*, *ἠπίαλος*, *θέρμη*, etc., but notwithstanding this, it seems certain that by the third century B.C. the greater part of Greece and of the south of Italy was at least as malarious as it is to-day, but in order to show that this was the cause of national decay it is necessary to produce evidence that in the great days of the sixth century malaria was unknown or rare. The evidence which Mr. Jones relied on is hardly convincing on this point and, indeed, there is a strong presumption in favour of the contrary view. In a paper with which he opened the discussion on the structure and function of the spleen during the Annual Meeting at Edinburgh Professor John Tait quoted from Hippocrates (BRITISH MEDICAL JOURNAL, August 20th, 1927, p. 291) evidence of the universal prevalence of malaria in his day. Apparently a large spleen was considered as normal, for Hippocrates says: "When the body flourishes, the spleen wastes." Mr. Jones and Dr. Withington, on the other hand, consider that malaria was rare in the time of Hippocrates, and that the degradation of medicine from the rational school of Hippocrates to the miracle-working charms and snakes of the Esculapian temples was due not only to mental enfeeblement from malaria, but also to the failure of the rational physicians in the absence of quinine to cure the disease. According to this ingenious theory the sufferers in despair turned to magic and dreams and incantations for the help which science could not give. But whatever influence malaria may have had it must not be forgotten that there were other potent causes of decay in the Hellenic peninsula acting at the same time. The want of union between the city-states and the frequent and devastating wars between them—notably the Peloponnesian war and the war of Athens with Syracuse—exhausted the people and left the survivors of war and pestilence enfeebled in mind and body. Yet if Attica, Sparta, Corinth, and their neighbours were exhausted, the Greek race was by no means done with, for its colonies long survived and flourished in Asia Minor, Egypt, and the Mediterranean, and when Rome had made a physical conquest of Greece the vanquished revenged themselves by a spiritual conquest of the victors. After all, the later so-called Roman Empire was largely Greek, and Byzantium, which for centuries was the centre of western civilization and learning, was a Hellenic city, just as much as Alexandria. A writer in a recent number of *Nature* refers to the theory of Mr. W. H. S. Jones as being now generally rejected, but, nevertheless, we think with our reviewer of 1909 that he and Dr. Withington "have added a fascinating chapter to medical history and made a suggestive contribution to the study of the causes which influence the destiny of nations."

[1] ***Malaria and Greek History.*** By W. H. S. Jones, M.A., Fellow of St. Catherine's College, Cambridge, Assistant Master at the Perse School. To which is added The History of Greek Therapeutics and the Malaria Theory, by E. T. Withington, M.A., M.B., Balliol College, Oxford. Manchester: At the University Press. 1909.

ALL ABOUT TOBACCO.

THE Norman Kerr Memorial Lecture of the Society for the Study of Inebriety, though usually devoted to the consideration of alcoholic problems, really has wider applications, and in 1923 Sir William Willcox took the opportunity of authoritatively discussing drug addiction. Dr. W. E. Dixon has followed this excellent example, and his exhaustive and extremely interesting review of the tobacco habit, which is published in this issue (p. 719), is most appropriate in many respects, especially, perhaps, in connexion with the question of the effect of smoking on intellectual activity, and the opinion, expressed by Dr. J. R. Earp and based on observations made on the students of Antioch College, Yellow Springs, Ohio, that the non-smokers come out better than the habitual smokers. On this vital point Dr. Dixon considers that the interpretation of the results given by the experimental tests applied, which admittedly point to some inferiority on the part of the smokers, is so complicated by various factors as to be negligible. He comes to the comforting conclusion that on the whole smoking in moderation does not exert any harmful effect on the normal central nervous system. But the important question whether or not strict moderation in smoking leads to vascular degeneration as a rule or only exceptionally is left open for further investigation. It may be that the constitutional make-up is a determining factor in this respect, for Buerger's thrombo-angiitis obliterans, though not absolutely confined to male Hebrew smokers, occurs among this ancient race in such an overwhelming majority of the cases that Dr. Parkes Weber's alternative title of "non-syphilitic arteritis obliterans of Hebrews" has met with approval. It is rather attractive to speculate why smoking appeals to man and to the modern young woman. No doubt it exerts a mild stimulating effect followed by a soothing influence, so that it is adopted freely by both the dull and the irritable; but in addition the influence of rhythm, which forms part of the ritual of preparing and smoking a pipe, may—as in dancing, singing, and chewing gum—provide some satisfaction. The broad survey of the aspects of tobacco smoking given in this Norman Kerr Memorial Lecture contains a number of pharmacological points on which the lecturer has made observations in his laboratory, and thus there is an interest additional to the historical summary and the critical review of the literature. The relative importance and proportions of the constituents in various tobaccos and the smoke they yield have been investigated, and it was found that the pyridine contained in the smoke of smouldering vegetable material, including tobacco and coltsfoot leaves (the latter of which was at one time sold as a harmless smoking material for boys) has an irritating effect, and may produce diarrhoea, vomiting, and the early signs of shock. It will perhaps be disappointing to those smokers who feel attracted to denicotinized cigars to hear that Storm van Leeuwen found that their smoke contains as much nicotine as that from the same brand of cigars not submitted to the process of denicotinization; the explanation of this at first sight puzzling result would appear to be that the amount of nicotine in tobacco is no criterion of that in its smoke.

THE HEALTH SERVICES OF NORWAY.

THE Central Health Department in Norway is under the charge of a chief medical officer nominated by royal decree. It consists of two sections—a health section under a medical officer, and a pharmaceutical section under a pharmacist. Attached to the Central Department are the leprosy service, the antituberculosis service, and the service for the insane, together with a vaccinal institute for the preparation of serums and vaccines. The local authorities

for health are, in rural communes, the communal council, and in urban communes a separate health committee. The chairman of the council or health committee is the district medical officer, who is appointed by royal decree, and whose duty it is to supervise the medical practitioners, chemists, dentists, midwives, and assistant vaccinators of his area. The communes of the whole country are grouped into twenty prefectures, each of which has a medical officer-in-chief who supervises the district officers. The working of the system has recently been reviewed for the Health Organization of the League of Nations by Dr. H. M. Gram, director of health services, Oslo. The infectious diseases required to be notified by medical men in Norway are of the same type as in England. One difference is that open tuberculosis only is notifiable; another is that venereal disease is included. Leprosy is not notifiable by medical practitioners, but chairmen of health committees keep a list of local lepers and report on them annually to the Central Department. For the bacteriological diagnosis of infectious disease there are laboratories at Oslo and Bergen, and municipal laboratories in some of the chief towns; but Norway is a land of such wide spaces that it is difficult for country doctors to avail themselves of these facilities. In any case it is not intended that notification should await bacteriological confirmation. The Central Health Department has issued a manual for the guidance of practitioners on these points. All towns and most of the rural areas furnish monthly reports on epidemic disease to the central authority. Their annual reports, which are more correct, are tabulated in an official year-book, which is published in French and Norwegian. The only midwives allowed to practise are those who have gained a diploma in a Norwegian public school or in a school recognized by royal decree. Nurses and masseurs of either sex are under the district medical officers. Vaccination against small-pox is not compulsory, but no person can be confirmed or married in the National Lutheran Church or admitted to a high school without a certificate of vaccination. There is an antivaccination propaganda of some activity, but vaccination is gradually becoming more general, and is stimulated by every outbreak of small-pox. There are public services for the treatment of venereal disease, which work with some friction between rural and urban communes. Rural patients migrate into the towns in order to obtain better treatment, and the rural communes feel and voice their grievance at being required to meet the charges. A bill providing for State control of this service is at present under consideration. There is local abundance of water supply in Norway, but surface water is scarce and wells are often defective. Some towns use river water purified by filtration and chlorination. The few water-borne typhoid outbreaks of the last thirty years were traced to isolated wells. There is a temperance movement in Norway. During the late war prohibition was introduced of all drinks containing more than 12 per cent. of alcohol. The result was that smuggling and illicit distillation increased enormously. It is now a penal offence for a soldier, a driver or conductor of a tramway car, a railway servant, or a driver of a motor vehicle to consume a beverage containing more than 2.5 per cent. of alcohol while on duty or within six hours beforehand.

The Thomas Vicary Lecture before the Royal College of Surgeons of England will be given by Dr. George Parker on Thursday, November 3rd; the subject of the lecture will be "The early development of hospitals." The Bradshaw Lecture before the same College will be delivered by Sir Cuthbert Wallace on Thursday, November 10th; it is entitled "Enlarged prostate: a review." Both lectures will be given in the College at 5 p.m.

Nova et Vetera.

THE SERJEANT-SURGEONS AND THE SERVIENTES REGIS CONTRASTED.

Some account of the Serjeant-Surgeons to the King was printed in "Nova et Vetera," British Medical Journal, 1925, vol. i (p. 224); but it may be worth while to compare the serjeant-surgeoncy with other royal serjeantries. Domesday Book calls the King's Serjeants *servientes regis*. Serjeantry in olden times indicated a tenure of land, and as such was capable of descent from father to son. This leads me to the point of this note, which is that the serjeant-surgeoncy can never have had anything to do with a professional land tenure. One can understand, to take an extreme and unauthorized example, a feudal noble owning a manor by the tenure of serjeantry of cutting the King's corns before the coronation ceremony. Anyone can make shift to cut a corn; but the son of a surgeon, even if he follows his father's profession, need not of necessity be of any use in it, and it is inconceivable that a serjeant-surgeon could have held land by serjeantry tenure of a professional sort. The whole idea was that of personal service. Father, son, or grandson could officiate with the napkins at the coronation banquet, but not necessarily with the surgery of the period, rude though it may have been.

There was, however, nothing to prevent a doctor holding land by serjeantry when the tenure implied service of a different kind from the practice of his profession. Round instances the holding by Walter Devenish of land in Devon by the serjeantry of finding three arrows when the King should hunt on Dartmoor. The land in question was Skirradon in Dean Prior, on the south-east border of Dartmoor. Roger de Mirabell had forfeited it for homicide, and Henry III had transferred it to Walter with the same service. Now Walter le Deveneis was Hubert de Burgh's physician. Round observes that this is a typical instance of petty serjeantry, which John defined in the Great Charter (1215) as the service of supplying us with knives, arrows, and the like. The classification of free tenures was as follows: frankalmoin, military service, serjeantry, and free socage. Littleton, in *Tenures*, sec. 153, wrote as follows:

> "Tenure by Grand Serjeantry is where a man holds his lands or tenements of our Sovereign Lord the King by such services as he ought to do in his proper person to the King: as to carry the banner of the King, or his lance, or to lead his army, or to be his marshal, or to carry his sword before him at his Coronation, or to be his sewer at his Coronation, or his carver, or his butler, or to be one of his chamberlains of the receipt of his exchequer, or to do other like services, etc. And the cause why this service is called Grand Serjeantry is, for that it is a greater and more worthy service than the service in the tenure of escuage (knight-service). For he which holdeth by escuage is not limited by his tenure to do any more especial service than any other which holdeth by escuage ought to do: (the service due from a knight's fee was uniform), but he which holdeth by Grand Serjeantry ought to do some special service to the King, which he that holds by escuage ought not to do."

All serjeantry ranked below knight-service and above socage. Tenure by serjeantry is as old at least as Domesday Book. Round gives the following instances occurring in the survey:—Surrey: Odard, *balistarius* of Moulsey; Tezelin, the cook, kitchen-service. Hants: William, *arcuarius* (archer) of Bentley; Geoffry of East Worldham (marshal-sea); Miles, porter at Winchester Castle. Dorset: Osmund, baker-service. Somerset: John, usher-service. Devon: William, porter at Exeter Castle. Cambridgeshire: Erchenger, baker-service. Essex: Walter the cook. Suffolk: Ralf, *balistarius* of Burgh, crossbowman-service. We may therefore define serjeant-surgeoncy as the personal professional service to the King without the holding of land by serjeantry of that particular service.

If any readers are inclined to think that my instance of cutting corns is improbable to a high degree, let them

remember that the "mighty Norman houses of Bigod and Giffard held, in succession, an Essex manor by the service of scalding the King's swine."

I am afraid that those who look for facts about the Serjeant-Surgeons in this article will find more of serjeantry than of surgery; but I hope it will be conceded that I am correct in my assumption. I assume, though I do not know, that a similar train of reasoning would apply to the serjeants-at-law.

In conclusion, I must state that I am indebted to J. Horace Round's *The King's Serjeants and Officers of State* (1911) for the facts relating to serjeantry which are recorded here.

R. R. James.

A MENTAL RECEPTION HOSPITAL.

Opening Ceremony at Northampton.

The new Reception Hospital of the St. Andrew's Hospital for Mental Diseases, Northampton, was formally opened, in the presence of a large company, by the Lord Chancellor, Viscount Cave, on the afternoon of Friday, October 14th. The chair was taken by the Marquess of Exeter, president of the hospital. Lord Cave, in his address, pointed out that this was the first hospital of the kind to be established in England for the treatment of recent cases of mental illness entirely apart from chronic cases, and he hoped that other institutions would follow on these lines. He also stated that he knew for a fact that the report of the Royal Commission on Lunacy was under the active consideration of the Government.

The conception of the governors of St. Andrew's Hospital that all mental patients—whether voluntary boarders or certified—who are recoverable, and who are likely to respond to treatment, should be received in a separate hospital, far removed from patients suffering from chronic forms of mental disorder, was first taken into active consideration in 1914, but the war prevented its realization until 1924, when the foundation stone of the building was laid. The cost of its erection and equipment has been £68,000.

The New Building.

The new reception hospital is built on the bungalow plan, with a central two-storied block. It faces south and has its own separate entrance, gardens, and recreation grounds. Accommodation is provided for sixteen patients of each sex, and also for the sister-in-charge and seven nurses. On both the male and female sides are large dormitories opening on to wide verandahs on to which the beds can easily be wheeled. There are a number of separate private bedrooms, and private sitting rooms are provided for patients who require them. All the patients' rooms face south, looking out over a wide agricultural valley, and the solaria on which the general sitting rooms open get the sun all day. The dining rooms for the patients are close to the central kitchens, and are arranged with tables, each seating four persons.

Each side has a large room specially set apart for clinical work. Here a complete survey of the physical and mental state of the patient is made. In addition to adequate provision for ear, nose, throat, and eye examinations, and preliminary survey of the teeth, ample facilities are provided for the special examinations that modern bacteriological and biochemical methods demand. The preliminary blood examinations and fractional test meals are also carried out here. The investigation of hidden focal sepsis will be a special feature, and a system of case recording has been devised which will facilitate the periodical overhaul of each patient and the accumulation of facts relating to the effects of varying forms of treatment. Great stress is laid on the importance of this overhaul, and it is undertaken at intervals of not more than two months.

The laboratories, on the first floor of the central block, are an important part of the scheme. Two are provided, one for bacterial investigation and morbid anatomy, the other for biochemical investigations. Here the detailed examinations of the blood, urine, stomach contents, faeces, cerebro-spinal fluid, and exudations of each patient are carried out. The bacteriological laboratory, in addition to being completely fitted out with everything necessary for such work, is provided with special apparatus for continuing and elaborating the researches of the late Dr. W. Ford Robertson (bacteriologist to the Scottish asylums) on anaerobic bacteria and their relation to neuro-toxaemia, which promise to throw important light on mental disease. The biochemical laboratory is also fully equipped for its purpose, and efficient sterilization and preparation rooms are adjacent. It is intended to carry out extensive researches in all branches of mental disease in order to determine how far infective processes are active in the causation and what help can be obtained in the fight against them. The clinical and laboratory staff will be in constant consultation on all subjects relating to treatment.

On the first floor of the central block is a fully equipped operating theatre with anaesthetic and sterilizing rooms adjoining, and a bed-carrying lift is provided so that patients can be wheeled from their rooms to the theatre. On the ground floor of this block there are consulting rooms for psychotherapy, a medical library, and dispensary, in addition to the dental room, and *x*-ray and electrical departments. The dental room has an *x*-ray outfit, so that photographs can be taken without the patient moving from the dental chair. The *x*-ray department is provided with a very complete screening outfit, and the couch embodies all the latest ideas and improvements. It is fitted with a Potter Bucky diaphragm. The set will provide a peak voltage of 170,000, and every form of treatment, except deep therapy, can be carried out here. The control of the current is so placed that there is no possibility of a patient getting access to it. The electrical department is fully equipped with the most modern apparatus, and the rooms have been furnished with the object of making the patient as comfortable as possible while undergoing either local or general artificial sunlight treatment. High powered diathermy and high-frequency apparatus are also installed.

A separate hydrotherapy department is provided in each block, close to the dormitories. The main room is provided with three baths for prolonged immersion, with thermostatic control, so that it is impossible for the hot water supplied to exceed a temperature of 110° to 115° F. The electric bath has no earth connexions, and a sinusoidal surging cufrent of 25 to 100 volts is employed. All these baths are so arranged that a number of patients can receive individual attention at the same time. Scotch, Aix, and Vichy douches are provided, as well as the latest appliances for sprays, needle baths, etc. Adjoining is a room for massage and manipulative treatment, with a dressing room off it, and in another room provision is made for various kinds of hot packs used in connexion with the baths. Special care has been taken in the installation of the most up-to-date equipment for intestinal lavage on the Plombières system, so valuable in the treatment of mental cases. The hydrotherapy department is completed by a Turkish bath installation in a separate building close to the hospital, where all forms of hot air and vapour treatments are provided.

The Opening Ceremony.

After the company were seated, Sir Frederick J. Willis, chairman of the Board of Control, made a statement in which he said that while the public health of the country had improved in the last fifty years, the same could not be said of public mental health, and he congratulated St. Andrew's Hospital on taking such a notable step further to deal with the problem. He was especially glad that research would take a prominent place in the work of the new hospital.

The Marquess of Exeter then asked the Lord Chancellor to declare the Reception Hospital open. The opening ceremony followed, and the Bishop of Peterborough (Dr. Claude Blagden) said a dedicatory prayer.

A vote of thanks to the Lord Chancellor was proposed by Mr. Christopher Smyth, chairman of the Committee of Management, and seconded by Sir Charles Gunning. The guests afterwards inspected the hospital under the guidance of the medical superintendent, Dr. Daniel F. Rambaut.

FOOD POISONING.

Malcolm Morris Memorial Lecture.

The second Malcolm Morris memorial lecture, under the auspices of the Chadwick Trust, was delivered in the Hastings Hall of the British Medical Association House, Tavistock Square, on Monday, October 17th. The lecturer was Dr. W. G. Savage, medical officer of health for Somerset, who took for his subject "Food poisoning." The chair was occupied by Sir William J. Collins.

Dr. Savage, after a tribute to the late Sir Malcolm Morris, whose interest in public health problems was always fresh and stimulating, began his lecture by pointing out that food poisoning must have been present from the earliest ages of mankind. Only by experience could man have learned what foods to take and what to reject. The appointment of "tasters" to kings and other highly placed persons proved that deliberate food poisoning was of very early date. But new types of food poisoning had arisen in modern civilized communities, with the necessity for conserving food for long periods and the desire of people to have their palates tickled by made-up foods or foods preserved in various ways. The simplest type of food poisoning was that in which the poison was inherent in the animal or plant eaten—for instance, the globe fish, which caused many deaths in Japan, or certain kinds of fungi, which occasioned poisoning outbreaks in this country. Again, there was the admixture, accidentally or by design, of poisonous chemical substances with the food. The arsenical spraying of apples seemed to be dangerous, for poisonous doses of arsenic had been found on apples so treated. Not very long ago there was an outbreak of belladonna poisoning in a family who had been consuming stuffed breast of mutton; the mutton had been stuffed with sage, mixed with which were a certain number of belladonna leaves.

The great bulk of food-poisoning cases, however, were due to bacteria. Dr. Savage described a typical bacteriological outbreak which he had investigated in an isolated country village. A woman had purchased pig bones from the local butcher, and had used them to make brawn. As a result of eating the brawn, seventeen persons suffered from poisoning and three died. A bacillus was isolated from a fatal case, and was without doubt the cause of the outbreak. The pig from which the bones had been obtained had evidently suffered from disease, judging by one leg which it was possible to examine, and probably its disease was due to infection with the same bacillus. It was for a long time supposed—and indeed the idea still lingered—that the cause of poisoning outbreaks was the eating of food which was in some way tainted or decomposed. The common name for such cases was "ptomaine poisoning," and the term was still freely used although it was wholly incorrect. There was no such thing as ptomaine poisoning. In the first place, no ptomaines were formed in meat or other food until it was far too nasty to be eaten even by the most ravenous. Ptomaines were produced only in a very late stage of the decomposition of organic matter. Again, in practically all poisoning outbreaks there was one characteristic, namely, that in appearance, taste, and smell the food which caused the poisoning was indistinguishable from sound food. A special group of bacilli, the Salmonella group, was responsible for at least, on a rough computation, three-fourths of the outbreaks of food poisoning. These bacilli grew very rapidly in food, particularly in hot weather, but the food did not show any physical change.

One feature of poisoning outbreaks was their seasonal prevalence. They were distinctly more frequent in the summer months. On analysing a list of 200 outbreaks of which he had had experience, he found the cause to be approximately as follows:

Canned foods	30 per cent.
Milk	7 ,,
Milk products (chiefly ice-cream and cheese)...	8 ,,
Made-up meats	27 ,,
Meats less manipulated (for example, stuffed)	4 ,,
Fresh meat	16 ,,
Fruits and vegetables	4 ,,
Other foods	4 ,,

As during a part of this investigation he was specially looking for instances of canned-food poisoning, it was possible that the proportion set out under that head was rather higher than the average, but the point was that 72 per cent. of the outbreaks were due to foods which had been man-handled in some way or other, such as chopped meat, meat pies, brawn, sausages, canned foods, ice-cream, and milk. A great many foods of this type had been heated up and slowly cooled, a process which offered considerable opportunities for contamination, especially if the cooling took place in dirty surroundings. He instanced an ice-cream outbreak, in which the producer had made five gallons of ice-cream from milk, cornflour, sugar, and flavouring matters, all the ingredients being good, but, after boiling, had left the mixture to cool in an insanitary yard before freezing. As a result there were 400 known cases of poisoning, though, fortunately, only one death. The investigation showed that the cooling mass must have been infected by bacilli which had had time, before the freezing took place, to multiply to large numbers. The Salmonella group had one property which it shared with no other group of micro-organisms—namely, that though the organisms were rather vulnerable, the toxins they produced were heat-resistant. Food could be boiled for an hour, and the poisons were not destroyed. After a brief reference to botulism, Dr. Savage passed to a discussion of the prevention of food poisoning; poisoning, instead of being a sort of general infection of food with bacilli, was a very specific infection. Prevention therefore resolved itself into a determined hunt to find the sources from which these food-poisoning bacilli came. The Salmonella were not natural inhabitants of the intestinal tract of man or animals, but they were found in diseased animals, and possibly a number of the outbreaks were due to diseased animals being used for food. More often, however, these bacilli got on to the food from outside sources, connected with the handling such foods received, either in the preparation or the storage. Sometimes infection might be carried by flies or by vermin in slaughter-houses, dairies, and similar places. The first principle of prevention was to find the reservoirs of these bacilli and destroy them. The second principle was scrupulous cleanliness in the food trades, especially the enforcement of Section 12 of the Meat Regulations of 1924. The third line was to take much greater care in the treatment of made-up foods. There was urgent need for the registration of premises where made-up foods were produced, in the same way as bakeries and the like. The individual was practically defenceless, except, of course, that he would do well to practise strict rules of cleanliness in relation to food and to obtain his food from reliable sources.

A vote of thanks to the lecturer was proposed and seconded respectively by Sir StClair Thomson and Sir Harold Morris, K.C., the latter the son of the man in whose memory the lecture was founded.

England and Wales.

Newcastle-on-Tyne: The New Session.

The formal opening of the winter session at the University of Durham College of Medicine, Newcastle-on-Tyne, took place on the evening of October 11th. Sir Thomas Oliver, president of the college, took the chair, and in opening the proceedings paid a tribute to Mr. H. Brunton Angus, emeritus professor of surgery, and to Dr. H. E. Armstrong, the first lecturer in public health at the college, of whom obituary notices appeared in our last issue. The introductory address was given by Sir John Rose Bradford, President of the Royal College of Physicians of London, whose subject was "The study of medicine." After remarking that, in his experience, it was very rare for students to regret having chosen medicine as a career, he asked why the study of medicine should prove so satisfactory to its disciples and yet not lead to that extreme narrowing of mental outlook sometimes seen in other avocations. The reason for this was twofold—in the first place, medicine was a branch of natural knowledge;

secondly, its practical applications were so numerous and ever-increasing that there was scarcely any department of human activity that did not enter into close relations with medicine. The student was thus not only brought face to face with problems of surprising scientific interest, but of necessity came into close relation with his fellow creatures, at times when the artificialities of life were broken down and human nature was faced with realities. Much of the criticism of the medical profession by intelligent laymen was justified by the tendency of some of its members to lay down the law on various matters as though their conclusions were warranted by facts instead of being mere opinions. This tendency to dogmatic utterances was one to be guarded against. Another point made by Sir John Rose Bradford was the need for those embarking on a medical career to develop a correct attitude of mind by correct methods of study. The vote of thanks was proposed by Professor Thomas Beattie and seconded by Professor Stuart McDonald.

A Contributory Scheme for Birmingham.

In the *Birmingham Post* of October 8th considerable space is devoted to an account of a new "contributory scheme" for hospital benefit which it is intended to launch in that city in January, 1928. Despite the space given to the project the account is not very clear, at least not in what we would regard as the essential features of such a scheme. So far as it is now set forth the plan is this: The scheme is to be organized by the Saturday Fund as the collecting agency; this body will have special representation on the central committee. Contributors will be required to pay a minimum of twopence a week. The employers will be asked to pay an amount to the fund equal to one-fourth of that contributed by their employees. There will be a hospital guild for the purpose of gathering contributions from those who are outside the normal operations of the collecting scheme, so that in the event of such contributors requiring treatment they will not be asked to pay for their maintenance while in hospital. It is hoped that those who are over the income limit will subscribe or make donations to the scheme. The hospitals will be open without charge to the very poor who are unable to join the contributory scheme. Others whose income is limited and who are accepted for hospital treatment under the present practice of the hospitals will be eligible for free treatment if they belong to the scheme. Contributors not considered eligible for free treatment may be called upon to make some additional payment to the funds of the hospital in accordance with the present practice of the hospitals. "It is hoped each hospital will make a maintenance charge for those patients who are non-contributors and who could afford to pay twopence per week." Hospital and convalescent home benefits will be extended to actual dependants of contributors. The basis of distribution of the funds will be the cost of maintenance of patients other than those provided for by grants from public authorities and private ward and other fees. Eventually it is anticipated that the whole of the net cost of the maintenance of contributing patients will be met out of the contributory scheme. It is intended that the districts immediately adjoining Birmingham shall be linked up with it in this project.

The scheme contains some novel features which call for careful consideration by the medical profession, and we have no doubt that the executives of the Divisions of the British Medical Association in the areas to be included will investigate the matter fully. It would appear that there is to be an income limit for what may be termed average contributors, but its amount has not so far been disclosed. The average contributors to the scheme when admitted to hospital will receive free treatment. Our contemporary writes:

> "Among the signal advantages of the new scheme is that it will enable the hospitals finally to abandon the inconvenient and unpopular ticket system. Incidentally it will also imply the abandonment of works collections in aid of particular hospitals. It will increase, certainly to an appreciable extent, and probably largely, the number of those who hold that by virtue of their weekly contributions they establish a right to hospital treatment in case of sickness."

There are two features of some novelty in this scheme. One is that the promoters appear to intend that those who are not properly of the economic status included within the income limit (whatever that may be) may yet be admitted members of the scheme, but if and when admitted to hospital, will be required to make some payment to the hospital over and above that which the hospital will receive from the fund on their account. Further, the promoters of the scheme desire the hospital authorities to require payment from persons admitted to the hospitals who are not members of the scheme and who are deemed to have been capable of making the minimum payment of twopence a week. Throughout the account of the scheme there is not a word or hint of the bearing all this will have upon the economic status of the medical staffs of the hospitals. In some of the paragraphs phrases are used which, if taken literally, would render the medical staffs of these hospitals liable to give their services gratuitously for those patients who pay in part or in whole for their hospital treatment, for it is written: "The basis of distribution of the funds will be *the cost of maintenance of patients*" (the italics are ours). In yet other places the wider term "treatment" is used. Another novel feature of the scheme is the association of employers in a financial obligation to supplement the contributions of their employees. It appears that the first suggestion was that this amount was to be one-third that contributed by the employees, but that it was afterwards settled at one-fourth.

Contributory schemes are forms of insurance. They are just as much insurance as the insurance of one's house against fire. There is a tendency in some quarters to attempt to disguise this fact by a haze of philanthropic zeal on behalf of the hospitals. Such zeal is right and laudable, but it should not be allowed to blind the critical eye, so that it fails to scrutinize the details of the policy of insurance which is enacted under the guise of such contributory schemes. A lack of care in the initiation of these schemes may mean a world of trouble later on, and possibly strained relations between the authors of the schemes, the hospitals, and the contributors, which might be avoided by a little cool criticism at the outset.

New Isolation Hospital at Southport.

Sir George Newman opened a new isolation hospital at Southport on October 15th, this being the first building of the kind erected in England since the war. The hospital contains two scarlet fever wards of twenty-two and twenty beds respectively, a diphtheria block of twenty beds, an observation block of eight beds, and a discharge block of two beds. There is, in addition, a tuberculosis pavilion of twenty-two beds, and shelters providing accommodation for eight patients. Should it later be found necessary, it will be possible to erect an additional fever block in the hospital enclosure and also another tuberculosis pavilion. The estimated cost of building and equipping the hospital was £81,000, and an additional sum of nearly £16,000 was required for the purchase of the land. Sir George Newman referred to his recent visit to America, and said that he believed the Southport Isolation Hospital must be one of the finest of these institutions in the world. In the course of his speech he emphasized the importance of securing the friendly co-operation of private practitioners in the prevention of disease, and paid a high tribute to those engaged in the health insurance service. Early diagnosis and prompt notification of such infectious diseases were, he added, exceedingly necessary if the public health was to be maintained and improved.

Surgical Instrument Manufacturers' Association.

The annual dinner of the Surgical Instrument Manufacturers' Association was held at the Holborn Restaurant on October 14th, under the chairmanship of Mr. Ernest W. Mayer. The toast of the association was proposed by Mr. P. C. Maw, who referred to the valuable work done by the association during the past year. Sir John Corcoran, director of the National Union of Manufacturers, remarked on the fact that the association included in its membership more than 90 per cent. of the manufacturers engaged in this branch of production. Its application

Industries procedure had been rejected by the Board of Trade on the ground that the industry was not of substantial importance and that foreign competition was not exceptional; but Sir John Corcoran said that when he was at the War Office during the war he never heard it suggested—and in the circumstances of that time it would have been unthinkable—that the industry was not substantial or of national importance, while as to the second point, there was a large foreign importation, and it ought not to be necessary for the association, in order to get a safeguarding duty, to prove that it was exceptional. The association was also bringing forward an application for the marking under the Merchandise Marks Act of surgical instruments on their importation. He thought it was wise to press for this, because if goods were imported unmarked it was a matter of extreme difficulty, in view of the wiles of the importers, to prove that they were of foreign origin once they had been distributed. Mr. Cecil Rowntree, F.R.C.S., who spoke as one of the guests, said that the industry might truly be described as a philanthropic one, especially since the advent of stainless steel, for instruments so made seemed as if they would last for ever. Mr. L. Ferris-Scott, Financial Secretary and Business Manager of the British Medical Association, complimented the manufacturers upon the imagination they invariably displayed, and said that he knew how fully the medical profession recognized the debt it owed to the instrument makers of the country.

Room Disinfection in Infectious Diseases.

In his report for 1926 Dr. R. H. H. Jolly, medical officer of health for the county borough of Wolverhampton, comments upon disinfection in connexion with infectious diseases. While agreeing that the value of steam disinfection of the bedding and wearing apparel of these patients is unchallenged, he expresses the doubt whether anything is gained by sealing up rooms and burning formalin lamps in them, in view of the uncertainty whether the infecting agents of acute contagious diseases can survive for many hours on furniture, walls, or carpets, and the probability that the disinfectant liberated in the room is unable to destroy the bacteria. He states that the abandonment by various health departments of room disinfection for scarlet fever and diphtheria has not caused any adverse results; this supports the view that direct transference of the infecting agent from one person to another is the usual method of the spread of contagion. Dr. Jolly adds that, since the use of scarlatinal antistreptococcal serum became a routine measure in all early cases of scarlet fever, it has been found possible to reduce the length of the stay in hospital of these patients by nearly a fortnight without increasing the risks of infection after discharge. He thinks that the serum has also been particularly valuable in the treatment of severe cases. Only a few patients with septic infection were admitted to hospital during the year, but when the serum was administered early in this condition they made quick recoveries and their convalescence was uneventful. With a view to providing better accommodation for the isolation of doubtful cases, or of those with a double infection, the erection of an isolation ward containing ten single cubicles is proposed.

Central Midwives Board.

The Central Midwives Board for England and Wales met on October 6th, when Sir Francis Champneys (president) was in the chair. A communication was received from the Society of Apothecaries of London, stating that it had nominated Dr. Thomas Vincent Dickenson to be its representative in lieu of Mr. Charles Sangster; and a vote of condolence with Mr. Sangster's family on his death was adopted. In reply to the medical officer of health for Lindsey the Board expressed the opinion that it would not be possible for each practising midwife to have a pair of callipers, and that the local supervising authority should keep a stock of these instruments for use by midwives when required. In reply to an inquiry from the medical officer of health for Surrey, the Board stated that "in all cases the person actually conducting a confinement should sign the form of sending for medical help." The Board approved for one year the scheme of the Birmingham University for lectures to be delivered to pupil midwives in the area. The following institutions were approved as training schools: Bury Union Hospital; Mill Road Infirmary, Liverpool; Nowrosjee Wadia Maternity Hospital, Parel, Bombay. It was reported that applications from midwifery authorities in various parts of the British Empire for the conclusion of reciprocal arrangements between them and the Board had been received, and the Approvals Subcommittee was given power to co-opt one or more additional members for their consideration.

The amendment of the Registration of Nursing Homes Bill, to the effect that non-county boroughs and urban districts employing whole-time medical officers of health should be the registration and inspecting authorities for nursing homes (including maternity homes) in their district, was considered, and the Board adopted a resolution strongly deprecating the amendment in so far as maternity homes were concerned, and instructed the secretary to advise the Minister of Health and also the County Councils Association of this opinion.

Scotland.

Aberdeen University: The New Session.

The winter term of the Faculty of Medicine of the University of Aberdeen opened on October 11th. Professor A. W. Mackintosh welcomed the students, and in reference to the resignation of Professor MacWilliam from the chair of physiology after forty-one years, said that they were glad to know that he was still to be with them for a few months. The resignation was a tremendous blow to them all. They were proud to have had such a distinguished scientist and lecturer amongst their alumni and professors, but he was sure that their chief and most cherished memory of Professor MacWilliam would be of the man himself, who was ever a kindly and helpful friend, most lovable and modest to a degree. Professor Mackintosh, in referring to the joint hospitals scheme at Foresthill and the town council's scheme of extension at Oldmill and the City Hospital, paid a warm tribute to the Lord Provost for his noble efforts in the great cause, and expressed his conviction that the great endeavour would be brought to full fruition. While a whole-hearted believer in the voluntary hospital system he was equally strong in the belief of the need for co-operation with the hospitals that were statutorily under the local authority. He considered that it would be an incalculable benefit to the sick if some working scheme could be arrived at, and he was glad to know that a movement towards that ideal was under consideration now in Aberdeen. Professor Mackintosh subsequently delivered his opening lecture dealing with the lives of Thomas Linacre (1460-1524), Francis Adam (1796-1861), and Charles Creighton (1847-1927).

New Combined Hospital at Aberdeen.

The Woodend Hospital at Aberdeen, which is to be utilized by Aberdeen municipal public health services, was opened on October 15th by Sir John Gilmour, Secretary of State for Scotland. Lord Provost Lewis and the magistrates of the city, as well as members of the Aberdeen Parish Council, were present. Sir John Gilmour said that the present was the first example of the coalescence of hospital services to take place in Scotland. It was no easy matter to bring about uniformity in services, whether public or private, for special services developed as time went on under different conditions. There must come a time, however, when overlapping and wasteful expenditure arose. The example now given by Aberdeen was an instance of the way in which harmony might be attained through wise leadership, and this had been achieved through the helpful and capable guidance of the Lord Provost of the city. The scheme was fully approved by the Scottish Board of Health. A wide appeal had been made for public help, and the project had been well received by the people; its development would be watched

with the greatest interest. He was a strong supporter of the voluntary hospitals, and believed that in Scotland they would not be abandoned without great misgiving, but he was equally certain that there ought to be the closest co-operation between the great national services, the town and parish councils, and the voluntary hospitals.

Medical Gymnastics.

A congress, the first of its kind, was held under the auspices of the Chartered Society of Massage and Medical Gymnastics in the Rankin Hall, Glasgow, on October 6th and 7th. Mr. Matthew White, F.R.C.S., who presided at the opening, mentioned that out of 6,000 members in the society, 450 were resident in Scotland. Mr. Alexander Maclennan, M.B., C.M., delivered an address on crippling deformities in children. Mr. G. H. Stevenson, F.R.C.S., delivered a lecture on rest and posture in treatment, in which he remarked that continuity of treatment was an important factor during the whole twenty-four hours, whether the patient was awake or asleep. Correct posture during sleep should be prescribed for adults as well as children. Demonstrations were given upon such subjects as sling exercises for re-edueation in paralysis, and upon English and Scottish country dancing. The meeting was continued in Edinburgh on October 8th; a visit was paid to the massage department of the Royal Infirmary, where a demonstration was given by Miss Mann, who showed the treatment and exercises adopted by masseuses for stiff backs. In a lecture on foot conditions, Professor John Fraser dealt with the peculiarities of the arch of the foot and with various congenital and acquired deformities, pointing out what could be remedied by massage and what could not. In the afternoon the annual meeting of the Chartered Society of Massage and Medical Gymnastics was held in the Royal Infirmary, Sir Cooper Perry, M.D., presiding. A proposal to prepare for publication a kind of directory of masseurs, together with their addresses, qualifications, and forms of treatment, was favourably considered. The meeting also considered the question of applying for State registration for persons practising massage.

Proposed Refraction Hospital in Glasgow.

A meeting of opticians was held in Glasgow on September 21st to consider a proposal which had been made for the establishment of a "Refraction Hospital" on lines similar to that of the London Refraction Hospital. Mr. R. Dickson presided, and referred to the need for such an institution in Glasgow in order to deal effectively with the optical needs of the necessitous poor. Speaking of the value of training for students in this matter, he mentioned that some 400 qualified opticians had gone through the course of the hospital in London. It was reported that the provisional committee, which had already been appointed, had received £380, and considered that the expenses of the first year would not exceed £250. The professed objects of this scheme are to provide voluntary service for eyesight testing; to form an educational centre for qualified opticians and students; to furnish facilities for the study and recognition of abnormal and pathological conditions of the eye, as well as providing special clinical instruction for opticians; and finally, to promote research in optical refraction. The meeting unanimously decided to proceed with the scheme, and a committee of opticians from various parts of Scotland was elected to secure premises in one of the poorer districts of Glasgow.

Health of Dundee, 1926.

Dr. W. L. Burgess, medical officer of health for Dundee, in his annual report for 1926, states that the population of the city was estimated at 170,060. The birth rate per thousand was 21.9, the corrected death rate 14.8, the infantile mortality rate 103, the general tuberculosis death rate 1.12, and the pulmonary tuberculosis death rate 0.81. The tuberculosis death rates are the lowest yet recorded, and mark genuine progress. The number of new houses completed during the year was 744. This is a "record" figure. It is estimated to be considerably in excess of the normal annual increment, and is therefore a substantial contribution to the reduction of the housing shortage. Of the 744 houses 389 were erected by the corporation and 355 by private enterprise. The problem of slum clearance still offers difficulty. The view is expressed that a two-roomed house may be quite healthy if the number and sex of its occupants are controlled. Re-housed slum dwellers on the whole keep their new houses well. The employment of women rent collectors with experience in house management is recommended in the public interest. In the month of June complaints were received from the west end of the city of a plague of mosquitos. It was traced to a pond in which larvae abounded. The peccant insect was the common gnat. The pond has been filled up. The personnel of the meat inspection staff is now complete, and the number of detections of disease among animals killed at the slaughter-house has doubled during the year. Tubercle bacilli were not recovered from any of the twenty-four specimens of milk submitted for examination. Of the 7,500 gallons of milk distributed daily in Dundee more than 50 per cent. is pasteurized. Dr. Burgess, under the present conditions of milk production and distribution, is strongly in favour of pasteurized milk and encourages its use. In Dundee there is little certified or Grade A (tuberculin tested) milk on sale, and its price in any case would be prohibitive for many. Pasteurized milk, on the other hand, is sold at the same price as raw milk, and may be obtained in bottles. Of sundry recent milk-borne infections in the city not one has been traced to pasteurized milk. An extensive outbreak of food poisoning due to milk occurred in the city in August. The causative organism was *B. enteritidis* (Gaertner), and the source of infection, which was promptly discovered, was a cow at a dairy farm suffering from enteritis. The Gaertner bacillus was demonstrated in the discharges of the cow, in the milk distributed, and in the excreta of the sick, and the specific immunity response was given by the blood of convalescents. The cow died of its enteritis, but all the infected persons recovered. Of 1,084 persons immunized against diphtheria fourteen were later suspected of suffering from the disease. Of this number two were undoubted cases; the rest were dubious, negative, or carriers. Testing and immunization on a minor scale were carried out in scarlet fever. Of 415 cases of primary and influenzal pneumonia nearly one-half were treated in Dundee Royal Infirmary. Nine cases of encephalitis lethargica were notified, all in late stages.

Science and Medicine.

The Royal Medical Society of Edinburgh began its 191st annual session on October 14th, when Dr. D. Noël Paton, F.R.S., professor of physiology in the University of Glasgow, delivered an inaugural address on the relationship of science to medicine. Dr. W. R. Russell, senior president of the society, who occupied the chair, reminded the audience that the Royal Medical Society had been closely connected with medical education in Edinburgh for nearly two hundred years, almost since the foundation of the Medical Faculty in the University. The society had had much to do in creating the reputation of Edinburgh as a medical school. Professor Paton said that science meant the pursuit of knowledge, while medicine was the application of knowledge to the diagnosis, treatment, and prevention of disease. Every good doctor must in addition be possessed of certain human characteristics, including kindliness, unselfishness, and sympathy. Two further qualities were also necessary—the power of keen observation and the faculty of reasoning from what was observed. The main object of the study of preliminary scientific subjects was to give the student this training in observation and reasoning. He believed that the science which above all others afforded this training was physiology. The medical man must know how to investigate the action of different structures in his patient, and he must know whether their action was normal. Further, this knowledge must be real and practical, not acquired from books or lectures. The qualities required either by the scientific investigator or by the clinician might be enumerated under five heads. First there was curiosity, with a perpetual asking of what, why, and how, similar to that possessed by every healthy and intelligent child.

Secondly, there was imagination to see various possibilities and where they led, with the power of employing theories as guides. Thirdly, determination was important, and these three were probably inborn characteristics. The last two qualities were the critical faculty by which the value of evidence could be estimated and, finally, the faculty of observing honestly and without preconceived ideas.

Ireland.

Resignation of Professor Pearson of Cork.

Professor Charles Yelverton Pearson, M.D., M.Ch., R.U.I., F.R.C.S.Eng., is resigning the chair of surgery at University College, Cork, on attaining the age limit. He has held the position for many years past, to the great advantage not only to the University, but to the whole medical profession in the South of Ireland. His position as the leading surgeon was recognized some years ago by the appointment as honorary surgeon to the King in Ireland. We understand that Professor Pearson is not retiring from active work, and all his friends and former pupils will wish him a long continuance of his useful life.

Local Government in Northern Ireland.

The report of the Departmental Commission on the Local Government Administration of Northern Ireland was presented to the Parliament of Northern Ireland on October 13th. The Commission was a large one; it contained about thirty-five members, including several medical men and several women. The doctors were Professor R. J. Johnstone, M.B., F.R.C.S., M.P., who was chairman; Lieut.-Colonel Dawson, O.B.E., M.D.; David Gray, M.A., M.D.; Professor J. A. Lindsay, M.A., M.D.; Dr. J. M. McCloy; Dr. W. McLorinan; Dr. H. S. Morrison, D.L., M.P.; and Alderman J. D. Williamson, M.D. There are forty-seven recommendations, but there are also several reservations by individual members. These recommendations deal with the abolition of boards of guardians and changes in the poor relief services, which it is recommended should be put on a county basis, under county council control. The individual recommendations will be noted later.

Commission on the Relief of the Sick and Destitute Poor.

In the course of its report the Commission on the Relief of the Sick and Destitute Poor states its conviction that the schemes, both positively and in their administration, have in some counties, particularly the larger, where the distances are considerable, operated prejudicially in the interests of the poor, while the saving in cost has been negligible. The classes that should not be retained in the county homes, and for which other provisions will have to be made, are unmarried mothers, married mothers, children, and mental defectives. Even if reserved for the aged and infirm poor and chronic invalids, the county homes, with one or two exceptions, require much structural alteration and improvement before they can be considered as coming up to the standard of comfort required. Discussing the provision of hospital accommodation the report states:

> The Commission are in full accord with the policy of establishing without overlapping or duplication, in the most accessible centres of population, public hospitals where the poor are likely, from the medical assistance available, to obtain modern and skilled treatment in surgery and medicine. The normal provision in each county or county health district would be one fully equipped central hospital, with district or cottage hospitals as auxiliaries, where distance and population justified such auxiliaries. Given a hospital which has established for itself a record of efficient and sympathetic administration, and to which admission can be readily obtained, distances of from twenty to twenty-five miles will not deter the poor from availing of it in areas where there are good roads and modern means of transport. In some counties the institutional accommodation provided for the sick falls far short of what the county scheme contemplates. The centres chosen for the county hospitals are, as a rule, suitable, but the hospitals themselves are not, in some instances, up to a reasonable standard, nor is the accommodation sufficient, while in others the development is taking place on lines that are not consistent with the general policy of complete severance from ordinary poor relief.
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> The county hospital should be an institution under one control in which both medical and surgical cases are treated. The arrangement in several counties under which surgical cases are treated in a county surgical hospital and medical cases relegated to the wards of the county home the Commission do not regard as satisfactory. Most of the district hospitals are situated in old workhouse buildings and, while exception cannot be taken in every case to this, the Commission think that, unless they can be effectively cut off from the unoccupied portions of these old buildings, the location will not ultimately prove satisfactory, and modern small hospitals will have to be provided. The accommodation for cases of infectious and contagious diseases does not appear to be inadequate except in the counties of Galway, Mayo, and Tirconaill, but in several other counties it is, for reasons indicated in the report, unsuitable.
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> Whilst recognizing the difficult problem presented by the advanced cases of tuberculosis the Commission does not think the county home is the proper place for them, or that they should be admitted to the district hospitals unless they can be completely isolated. The accommodation in some of the dispensaries visited was unsuitable and the furnishing of the poorest description. The order and cleanliness in a number were very bad, and, generally speaking, the standard of comfort was low. It is essential that the accommodation should be clean, comfortable, and well equipped, and sufficient to ensure absolute privacy for a complete examination should such be necessary.
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> The inspections of dispensaries by the Local Government Department's inspectors should be carried out without notice. Every encouragement should be given to the dispensary medical officers to look upon the hospitals as a necessary complement to the dispensaries. In support of the recommendation for surprise visits by inspectors the statement is made that the poor, as a whole, are very slow to make complaints; but because no complaints are made it does not follow that there are no grounds for complaint, and conscientious inspections very often obviate the necessity for complaint, and give confidence to the poor.

Dr. Hennessy, one of the members of the Commission, dissents from the opinions of his colleagues on this question, and submits a searching criticism of the defects inherent in the Poor Law medical service.

While recognizing that it is possible for a Board of Health, under a capable and businesslike chairman and with the help of committees, to work the administrative machine efficiently, the Commission is inclined to the view that in actual practice the Boards are not able to exercise the supervision which their institutions, officers, and services require. The Commission is unable to formulate any plan which, by merely altering the constitution or methods of procedure of the Boards, would be calculated to lead to more efficient administration. The alternative it recommends is the abolition of the Board of Health and the assumption by the county council itself of the control of poor relief, working through a paid official in entire charge of the Poor Law services of the county, like the general manager of a company under the control of a board of directors. Dealing with mental hospitals, the report states:

> The accommodation for the insane poor in the district mental hospitals (including the auxiliary mental hospitals) is either fully occupied or insufficient or unsuitable in all but three institutions (Kilkenny, Letterkenny, and Portlaoighise Mental Hospitals). The Boards of Health should be encouraged to avail themselves of the accommodation for mentally defective children that now exists. The Commission recommends that as an inducement to send such children to an approved institution a grant equal to half the net cost of maintenance should be made. Subject to the condition that the child can benefit by the training, the Board of Health should be empowered, if it think fit, to join with the parents of a mentally defective child in paying the expenses of maintenance in an approved institution. No child should be retained at the public expense in an approved institution beyond the time when improvement in his or her condition cannot be effected. Approved institutions for defectives should be visited and reported on by the inspector of mental hospitals. The Commission proposes that, without lessening the safeguards against improper detention, certain defects in the present procedure for admission should be remedied. The Commission recommends that in the case of poor persons who become insane, and whose relatives are not in a position to pay for the means of conveyance or for the medical certificate, that it be the duty of the home assistance officer to arrange for examination, certification, and transfer to the mental hospital. The Commission anticipates that, with an alternative procedure available to meet the necessities of poor persons, the number of committals as dangerous lunatics under the Lunacy Act, 1867, will be considerably reduced. The Commission recommends that the law should relieve peace commissioners, medical practitioners, and all persons giving certificates and making orders in connexion with the reception of patients into mental hospitals from liability to legal proceedings if they act in good faith and with reasonable care. The power to discharge patients on probation should be more freely used, and the maximum period of absence on probation extended.

Correspondence.

CATARRHAL VACCINES.

SIR,—The figures supplied by the Eton medical officers (October 15th, p. 702) are of considerable interest, and at first sight suggest that mass inoculations in schools are not of much, if any, value. But may I suggest that there is a fallacy?

These anticatarrhal vaccines cannot be expected to prevent epidemic influenza—at least, I have never hoped for such a result; I firmly believe that true epidemic influenza is at present beyond our control. What the ardent advocate of such vaccines does believe is that they can, and do, diminish the incidence of the endemic cold and catarrh which is the scourge of adolescent communities. The test of complications, which is, in my opinion, a much more reasonable guide to the efficacy of vaccines, is certainly not in favour of them, so far as the Eton figures go, but the epidemic was mild, and the total number of complications very small.

My own experience of a rather similar epidemic in January is as follows: The epidemic was clearly of a more severe type than that at Eton, but in its incidence, length of illness, and number of complications and their severity, the advantage lies with the inoculated. I have also included figures relating to colds and cases of pyrexia of unknown origin (that is, feverish chill) which occurred later in the term, after the influenza epidemic had ceased.

Haileybury College: Inoculation, 1927.

Non-inoculated (315).

Influenza	67=21.27%
Days lost	890=Av. 13.2
Complications	26
Pneumonia 5; bronchitis 6; otitis 6 (4 abscesses); frontal sinus and maxillary antrum (op.) 1; acute rhinitis 6; enteritis (haemorrhagic) 1; adenitis 1.	
Pyrexia of unknown origin	10=3.1%
Days lost	95=Av. 9.5
Complications	6
Bronchitis 2; otitis 3 (1 abscess); acute rhinitis 1.	
Colds (6 a second time)	71=22.5%

Inoculated (215). A.C. 95; P.S. 120.

Influenza	34=15.8%
Days lost	374=Av. 11
Complications	9
Bronchitis 4 (1 A.C., 3 P.S.); otitis 1 (P.S.); adenitis 4 (1 A.C., 3 P.S.).	
Pyrexia of unknown origin	5=2.3%
Days lost	55=Av. 11
Complications	4
Bronchitis 1 (A.C.); otitis 2 (abscesses, 1 P.S., 1 A.C.); adenitis 1 (P.S.).	
Colds	29=13.5%
(A.C. 9=9.4%; P.S. 20=16.6%)	
Days lost by the 34 inoculated influenza cases:	
7 A.C. cases (7.1%)	65=Av. 9
27 P.S. cases (22.5%)	309=Av. 11.5

A.C.=Parke Davis's Anticatarrhal vaccine; P.S.=Public School vaccine.

I wish more school medical officers would take the trouble shown by the Eton doctors, try the effects of vaccines, and publish their figures; it is only by the accumulation of figures from various sources that we can hope to get anything in the nature of proof. Those who, like myself, do believe in vaccine treatment for colds and catarrh may be wrong, and mistake *post hoc* for *propter hoc*, but meanwhile it seems to offer the only method of diminishing those common minor complaints which seriously affect the schools' welfare, far more so than the infectious epidemics. The public school vaccine, collected through the activities of the Medical Officers of Schools Association, prepared in St. Mary's Hospital Laboratories, and issued by Messrs. Parke, Davis and Co., is now on the market, and a circular is being issued to all school doctors, inviting them to make use of it and record their results.—I am, etc.,

L. R. LEMPRIERE,
Medical Officer, Haileybury College.

October 15th.

DENTAL RADIOGRAMS IN DIAGNOSIS.

SIR,—Permit me to draw attention to a practice which appears to be growing, and is, I venture to think, prejudicial to all concerned.

It is this. A doctor, thinking that the condition of a patient's teeth may have a bearing on the illness, sends him to a radiographer of his own choosing. On the strength of his own or the radiographer's interpretation of the resulting radiogram—often not too clear—he makes a diagnosis, possibly prescribes treatment, and either requires the patient's own dentist to carry it out or, very frequently, sends him to someone else of his own selection. Surely this is wrong.

Dental radiograms are a very valuable aid to diagnosis; but only an aid, and no substitute for clinical examination. They are often invaluable in revealing unsuspected trouble, more often still in affording ocular and convincing proof of what the dentist already knows or suspects; but, on the other hand, there may be serious sepsis without any sign of it in the radiogram; negative evidence cannot be relied upon.

Moreover, to be of value they must be really good, and to produce good dental films requires considerable practice. With certain brilliant exceptions, the dentist who takes his own usually attains to a higher level of perfection than the general radiographer. Far too many reports are made upon skiagrams so imperfect that no safe deductions can be drawn from them.

Having obtained good films they must be correctly interpreted, often no easy matter, and here again the dentist is more likely to be successful than the medical man, or the radiologist in whose report the doctor usually puts implicit faith.

As examples of the gross errors easily made I may mention a case where a patient was recently told by his doctor that an upper wisdom tooth was diseased and must come out, the "tooth" in question being the coronoid process of the mandible; and the frequent condemnation of lower premolars as the subjects of apical sepsis, by reason of the proximity of the inferior dental foramen to their roots.

It is obviously unwise to depend upon the shadow for diagnosis, and entirely ignore the substance. No dentist would rely solely upon radiograms apart from clinical examination and the clinical history. Were he limited to one or the other he would certainly choose a careful clinical examination.

It is not uncommon for a patient to come to a dentist with films taken at the request of his doctor and instructions that certain teeth are septic and to be removed, while others much worse have passed unnoticed.

It is not only discourteous to ignore the patient's own dentist, but shortsighted; because, if a careful man, he will have a recorded history of the mouth which may prove of the utmost value. The reasons why he is so often ignored by the doctor when a diagnosis is to be made would appear to be that the doctor mistrusts dentists in general (or, possibly with good reason, that one in particular), while he overrates skiagrams as a source of accurate and complete information, and fails to realize that their interpretation is a matter in which the knowledge and experience of the dentist and his clinical findings are of the utmost value, with the assistance of the radiologist in case of difficulty.

Surely the correct course is to refer the patient in the first instance to his own dentist, if he has one, for a report, with skiagrams, on the condition of the mouth. If, for any reason, this report should not inspire confidence, a second opinion should be sought. In this way the patient's best interests would be served, and no one would have cause to complain.

The facts are that the average doctor has very little knowledge of teeth, and the average dentist very little knowledge of general pathology; so that only by their close co-operation can the patient derive the maximum benefit.—I am, etc.,

J. H. BADCOCK.

London, W.1, Oct. 12th.

"THE HISTORICAL ASPECT OF QUACKERY."

Sir,—In a recent address I made a five-line reference to Hahnemann and a three-line reference to the followers of Abrams. These short references have provoked nearly five columns of correspondence, and since I naturally dread anything in the nature of a geometric progression in polemics, I will try to answer my critics as briefly as possible.

(1) *Hahnemann.*

Dr. Julian objects to my statement that Hahnemann established a dogmatic faith even more absurd than the orthodox traditions that he combated. The particular absurdity that I had in mind was not the doctrine that like cures like, but the belief in the efficacy of infinitesimal doses.

Hahnemann taught (*Organon*, 1833 edition) that the dosage of preference for drugs was the thirtieth dilution, which means a concentration of one part in 10^{60} parts. This represents a concentration of one molecule of the drug in a volume of solvent nearly equal to a sphere of which the great circle is represented by the orbit of the planet Mercury. Obviously the chances are practically infinite against any dose of this dilution containing a single molecule, atom, or electron of the drug.

The belief that drugs in these dilutions can produce any effect must appear absurd to all who accept the atomic theory of matter. If the homœopathists reject the atomic theory they escape the arithmetical difficulty that I have indicated, but they ought to make it clear that they are opposed, not merely to orthodox medicine, but also to the chief basic theories of chemistry and physics.

(2) *Quacks and Others.*

I agree with Dr. Reid that the definition I gave of the term "quack" excluded those men who have been instructed in medical science but have forsaken it in the search for universal cures. Medical history records a continuous succession of such dissenters from inductive science, but unfortunately I know of no simple generic term by which to describe them.

(3) *The Doctrines of Abrams.*

Sir James Barr has written a criticism of myself and my paper that I will try to avoid copying either as regards length or style.

The greater portion of his letter consists of abuse so vague as to be unanswerable, but he does make the definite statement that I seem to be "utterly incapable of accurately recording a historical fact." No one with any sense of responsibility would make a serious charge of this nature without adducing proof. Sir James Barr's letter fills four columns, but the only error of fact that he suggests is as follows: He says that in a former paper I stated that Perkins's tractors were made of wood and that I now say they were made of metal. I can only recollect mentioning these tractors in one paper[1] and there I twice stated that the tractors were metallic. I did, however, mention some imitation wooden tractors that were prepared and used by opponents of Perkins in order to show up this silly delusion. The whole point is rather trivial, but it does illustrate Sir James Barr's standards of accuracy in controversy.

I gather from Sir James Barr's letter that he thinks I have misrepresented the doctrines taught by Abrams and adopted by his followers. Now my only reference to this matter was the sentence: "The followers of Abrams believe that all diseases can be both diagnosed and treated by means of two boxes containing some simple electrical apparatus."

I cannot see that Sir James Barr or Dr. Reid have shown any inaccuracy in this statement. The statement describes the nature of the boxes and their alleged powers. As regards the nature of the boxes, Sir James Barr in his letter says that the curative box, the oscilloclast, is a broadcasting machine, whilst in a former paper[2] he described the principal component of the diagnostic machine as follows: "The rheostat or ohm meter is a specially graduated resistance coil." There can be no doubt, therefore, that the boxes contain electrical apparatus, and the apparatus in the boxes that I have examined appeared to me to be of a relatively simple character.

As regards the powers of the boxes, I deliberately understated the claims made by their advocates. Sir James Barr has described[2] how he could determine not merely the diseases of a patient, but also the sex and race, without ever seeing the patient, but simply by testing a drop of blood or a specimen of handwriting in the diagnostic machine of Abrams. He actually gave details of the diagnosis of cancer as an example of his technique. I have not seen or heard of any recantation of these opinions and therefore, as regards diagnosis, I think that I definitely understated the published beliefs of Sir James Barr.

The electronic theory of Abrams postulated that disease was due to an abnormal vibratory rate of the electrons of the body, and his diagnostic machine was supposed to measure the abnormal vibratory rate, whilst his curative machine was supposed to break down these abnormal vibrations. The theory therefore postulates that both machines are of universal application in disease.

I gather that Sir James Barr is a whole-hearted supporter of Abrams's theory. If he objects to my statement that Abrams's followers believe that all diseases can be treated by one of the boxes, will he mention where either he or the late Dr. Abrams has ever published any statement regarding the limitations of the use of the oscilloclast in the treatment of disease? I might mention that I chose the word "treated" instead of "cured" in order to make my statement as non-controversial as possible. I am of course aware that Sir James Barr does not rely solely on the oscilloclast for treatment; in his letter he mentions the use of spinal concussion (spondylotherapy), and in a previous paper[3] he has mentioned other somewhat unusual forms of therapy. For example, he recommended in the treatment of pulmonary tuberculosis the practice devised by Abrams of painting the chest with gamboge and wearing a blouse or undergarment of yellow silk. Again, in certain cases of epilepsy or migraine he recommended the patient to wear in bed a silk stocking on one leg, the right in the male and the left in the female.

I am genuinely puzzled at Sir James Barr objecting to the suggestion that the oscilloclast can be used for the treatment of all diseases, since this appears to me to be an obvious corollary of the electronic theory of disease.

Since Sir James Barr is the most distinguished electronist in this country, I hope that he will publish a statement regarding the limitations of his belief in Abrams's doctrines. This seems particularly desirable because Dr. Reid in his letter suggests that he regards the oscilloclast partly as an adjuvant to psychic suggestion, and this seems a very wide departure from the original electronic doctrines.

Sir James Barr actually mentions that the electronic practice attracted a large number of undesirable sycophants and camp followers, and although he believes that these are now discarded, yet it would be convenient if we could know the orthodox electronic faith and thus be enabled to distinguish the regular troops from the camp followers. As a start would Sir James Barr inform the medical profession whether he claims to be able to diagnose the presence or absence of cancer by the examination of a specimen of the handwriting of the patient?—I am, etc.,

Edinburgh, Oct. 17th. A. J. Clark.

[1] British Medical Journal, October 18th, 1924.
[2] *Medical Press*, 165, 283, 1922.

RELATIONS BETWEEN MUNICIPALITY AND VOLUNTARY HOSPITALS.

Sir,—At the Annual Meeting of the British Medical Association in Edinburgh this important question was discussed in the Section of Medical Sociology, but unfortunately time did not permit of a full and free discussion of the subject in all its aspects. There are several points which occur to me as worthy of remark.

The scheme as outlined by Mr. Eason was fairly put, and, as indicated by Mr. Neville Chamberlain, the idea is to place the Poor Law hospitals entirely without the

[3] An Address and Demonstration by Sir James Barr, delivered at the South-West of London Post-Graduate Medical Association, October 16th and 17th, 1924 (Samuel Hill and Sons, Liverpool).

control of the guardians; with this I am in entire agreement as the only true solution, in my opinion, of the proper treatment of patients who require to go either into poorhouse or asylum hospitals.

The Scottish view of the question was attended to by Mr. Reynard, chief executive officer of Glasgow parish council and district board of control, whatever that may mean. He began with the frank admission that, being a layman, he was not altogether competent to treat the subject from the medical point of view. With this one would entirely concur, as its truth was proved by the policy he had persuaded the Board of Health to sanction—namely, that mental patients could be admitted to Stobhill Hospital and kept there for—if I heard him aright—six months instead of six weeks. How the Lunacy Commission can allow this I cannot understand, seeing that for that period the patients have not the protection which the Lunacy Acts give to mental patients. I quite agree with Mr. Reynard that the poorhouse hospitals generally are inadequately staffed in comparison with the general infirmaries, and I am afraid Glasgow poorhouse hospitals suffer in this regard, though to a less degree, perhaps, than many of the Poor Law hospitals.

The great defect to my mind in our Poor Law institutions lies more at the door of many of our inspectors of poor. They are the stumbling-block officially. Some of the hospitals are in charge of part-time doctors, which is often an advantage rather than a disadvantage, as such doctors have a better chance of obtaining or advising reforms—that is, if its councillors are men and women who are out to do their duty to the best of their ability, and not such as those depicted by Dickens.

In my opinion the great and insurmountable defect in the use of Poor Law institutions is that the inmates are really paupers and are classed as such. The only authority in Scotland that has solved this problem is that of Aberdeen, where the Poor Law hospital has been handed over to the control of the infirmary authorities, so that the question of pauper or no pauper never arises. It was a pity that Mr. Reynard had nothing to say regarding this solution of the difficulty when, in closing the discussion, he answered various criticisms.

It should be borne in mind that the cost of voluntary hospitals with poorhouse cannot be compared except in the case of combination hospitals where there is a similar basis for comparison.

There is a further objection to parish council institutions in a large city, and that is the possible abuse of their power in converting them into penal places by keeping patients in hospital long after the need for hospital care and treatment is past; several such cases I have met with in my own experience, and I am sure others may remember similar cases.

It is a great pity that a Section which has such possibilities for good cannot be so arranged as to allow so important a question to be discussed in all its bearings. To my mind this subject was not allowed sufficient time for the adequate discussion it merited, and in future if the Section of Medical Sociology is to be a success its programme must be more carefully considered in regard to time. Unless this is done the Section will fail in its object and should be done away with.—I am, etc.,

Glasgow, Oct. 10th. THOMAS RUSSELL.

HOSPITAL POLICY.

SIR,—I have been much interested in your leading article on hospital policy (October 1st, p. 601). If the problem is to be tackled successfully a candid statement of facts as they are at present is essential.

I will deal with the conditions as they exist in Liverpool. I am only competent to speak from the physician's point of view. Of the four general hospitals which are associated with the local medical school the smallest contains 100 odd beds, the largest 300 odd beds. The other two hospitals contain over 200 beds.

Let me take the case of a hospital with 200 beds. The majority of these beds are used by surgeons. There will be about 60 or 70 beds at the disposal of the physicians, and there will usually be two full physicians and one or two assistant physicians to take charge of these beds. The assistant physician, be it remembered, is essentially an independent individual, with his own beds and patients.

It is obvious that a hospital of this size will have great difficulty in adapting itself to modern growth of medicine which makes specialization inevitable. The difficulty is twofold. There are not sufficient beds and material available to make effective special departments. There are only a few nerve cases, a few heart cases, etc., and these are divided among three or four men. Correspondingly, special departments such as pathological, biochemical, cardiographic, etc., must remain ineffective because the work can only be carried on on a very small scale.

The other difficulty is still greater. There are really not a sufficient number of trained men to staff the different departments. What frequently happens is this: If a hospital requires, say, a pathologist, it appoints a man to the position who has never had any experience at all on this subject apart from what he gained as a student, and solely by virtue of his appointment he becomes at once an expert in pathology. The same applies more or less to most other departments. A man who, possibly, has been a house-physician for a year and has been acting as a tutor for a few months is appointed to the position of a junior physician. He becomes at once an authority on all branches of internal medicine, ready to act as a consultant and to instruct students. In addition to this, he frequently is a pathologist, a biochemist, takes charge of a nerve clinic, and is quite ready to undertake the work of a cardiographic department. Could medicine be practised on scientific lines by these amateur "experts" at a teaching hospital? The difficulty is that small hospitals entail the multiplication of small, inefficient departments. Things are not so bad with regard to the premier institution in Liverpool.

The progress of medicine is such, however, that it is at present quite impossible for any man to become equally proficient in all its branches. It must not be forgotten that the general physician nowadays usually concentrates all his energies on a special subject, yet he is ready to act as an expert in all branches of internal medicine. If all Liverpool hospitals would amalgamate and thus become one unit, the difficulty would at once disappear. General wards in internal medicine are now no longer compatible with the progress of scientific medicine; but under a scheme of amalgamation it would be quite possible to have, say, 100 beds for nerve cases in one place under the direction of the most experienced man, with the rest of the nerve specialists working under him, all material to be available for all of them, for teaching, and particularly for research. The same applies to other departments. The cost of such a scheme would be really less than at present. It is not, however, very likely that such an arrangement would materialize in the near future in Liverpool.

Sir, I am a believer in the voluntary principle with regard to hospital policy, but if this policy is unable to adapt itself to modern requirements it will have to go.—I am, etc.,

Liverpool, Oct. 10th. I. HARRIS.

ULTRA-VIOLET RADIATION AND VARICOSE ULCERS.

SIR,—My attention has been called to some comments made by Dr. Weinbren (BRITISH MEDICAL JOURNAL, September 10th, p. 472) on the remarks made in my opening paper on "The uses and limitations of ultra-violet radiation in dermatology," at the Annual Meeting of the British Medical Association at Edinburgh (published in the BRITISH MEDICAL JOURNAL, August 13th, p. 255).

In reply to his question, I should certainly include varicose ulcers in the chronic septic type of ulcer benefited by ultra-violet light, but it is quite another matter to use it as a routine method for all varicose ulcers. It was exactly this indiscriminate use of actinotherapy for all sorts of conditions to the exclusion of other well tried methods, and the exaggerated statements often made of the results by observers insufficiently experienced to estimate them, that produced the "admittedly pessimistic vein" of my paper referred to by Dr. Weinbren.

I agree with him, however, that there is at present no

standard technique, and unless the method is mentioned, there is no common ground for comparison and discussion.—I am, etc.,

London, W.1, Oct. 15th. S. ERNEST DORE.

THE INJECTION TREATMENT OF VARICOSE VEINS.

SIR,—May I point out, with reference to your annotation of September 24th (p. 558), that in *La Presse Médicale*, June 2nd, 1926, xxxiv, No. 44, p. 689, a full account is given of the histology of veins treated by sclerosing injections.

This method has been in use for the last six years at the Necker Hospital in Paris, where the number of *piqûres* given for this purpose is now between 30,000 and 40,000, without any material accident of any kind. I may add that a solution of sodium salicylate is used to the practical exclusion of all other substances, and with very great success.—I am, etc.,

H. BECKETT-OVERY, M.D., F.R.C.S.

London, S.W.1, Oct. 3rd.

OXYGEN IN ACUTE PNEUMONIA.

SIR,—When the semi-conscious pneumonic patient is struggling on the borderland his airway may get obstructed by a relaxed tongue as in anaesthesia. This state, which increases anoxaemia, may be counteracted by placing the patient in a semi-propped-up, semi-curled-up position, which will allow the tongue to fall forwards, or by the attendant holding the jaw forward as in anaesthesia, or possibly by the insertion of an anaesthetic airway. The sound of easier inspiration resulting assures us that we have helped, and that the patient is getting more air-oxygen.

Is holding the oxygen tube without a funnel immediately in front of the patient's air intake an effective or a futile method of administration? Purgatives involving expenditure of energy are easily overdone in acute pneumonia. Are any needed after the first one if large quantities of water are given?—I am, etc.,

Erdington, Birmingham, Oct. 2nd. W. J. BURNS SELKIRK.

*** The value of oxygen inhalation and the best method of administering it were discussed by Dr. J. S. Haldane, F.R.S., in the course of a lecture on anoxaemia published in this JOURNAL on July 19th, 1919 (p. 65). The best types of oxygen apparatus were described, and one of them was illustrated by a diagram. It can, we believe, still be obtained from Messrs. Siebe, Gorman and Co., Limited, 187, Westminster Bridge Road, S.E.1. A discussion on the clinical methods of administration and therapeutic uses of oxygen was held in the Section of Therapeutics at the Annual Meeting in Edinburgh; a full report will be published shortly.

COURTESY CALLS.

SIR,—The remarks by "M.B., D.P.H.," on this subject in your issue of October 8th (p. 664) approximate my own experience closely. I graduated in medicine, after more than four years on active service with the infantry, and bought a practice almost two years ago.

I took an early opportunity to call on neighbouring practitioners. One of my nearest colleagues gave me a very unwelcome reception, together with a rather hopeless impression of prospects of success in the district. Possibly, as my colleague had been at home during the war, my war service did me discredit. Do courtesy calls promote good fellowship as they should?—I am, etc.,

October 8th. B.A., M.B., Ch.B.Ed.

ROYAL COLLEGE OF SURGEONS OF ENGLAND. MEMBERS AND THE COUNCIL.

SIR,—The council of the Royal College of Surgeons of England have just published the result of the poll of the Fellows of the College on the question of the admission of Members to some representation on the council. The voting paper was sent to 1,850 Fellows: of these 846 voted "No," and 234 voted "Yes"; 770 Fellows did not vote.

Unfortunately—and unfairly, I contend—the council issued with the voting paper a definitely biased and *ex parte* statement of the Members' case. It is remarkable that 770 Fellows did not vote. Also it should be noted that some 600 Fellows are in the metropolitan area.—I am, etc.,

London, S.W.1, Oct. 16th. REDMOND ROCHE.

DARWIN'S HOUSE.

SIR,—In an annotation in your issue of September 10th (p. 464) commenting on Mr. Buxton Browne's generous offer to buy Darwin's house at Down as a permanent memorial, it is stated that in the year 1842, when Darwin bought the property, it was only accessible by a long coach drive. This is not quite accurate, and in writing of such a master of accurate detail as Charles Darwin one should strive to be exact.

In *More Letters of Charles Darwin*, John Murray, 1903, vol. i, p. 31, I find the following letter, which was written to his sister Catherine about two months before he settled at Down.

To Catherine Darwin. Sunday [July, 1842].

"You must have been surprised at not having heard sooner about the house. Emma and I only returned yesterday afternoon from sleeping there. I will give you in detail, as my father would like, *my* opinion on it—Emma's slightly differs. Position: About a quarter of a mile from the small village of Down in Kent—sixteen miles from St. Paul's—eight and a half from station (with many trains) which station is only ten from London. This is bad, as the drive from [that is, on account of] the hills is long. I calculate we are two hours going from London Bridge. Village about forty houses with old walnut trees in the middle, where stands an old flint church and the lanes meet. Inhabitants very respectable—infant school—grown up people great musicians—all touch their hats as in Wales and sit at their open doors in the evening, no high road leads through the village. The little pot-house where we slept is a grocer's shop, and the landlord is the carpenter—so you may guess the style of the village."

Darwin then goes on to describe the house and garden and surroundings in detail, but the letter is too long for transcription here.—I am, etc.,

London, S.W., Oct. 3rd. E. MUIRHEAD LITTLE.

*** Our authority for what we said is the following sentence written by Sir Francis Darwin in *Rustic Sounds* (1917), Chapter X: "It would have been difficult to find a more retired place so near London. In 1842 a coach drive of some twenty miles was the only means of access to Down."

"THE STRAIGHT ROAD TO A LONG LIFE."

SIR,—Dr. Nuthall's interesting article (October 1st, p. 600) on Toby Venner's dietetics made me look up my copy (1650 edition), which is also interesting as it belonged to Thomas Lambarde, grandson of William the "Perambulator." On the flyleaf under his signature and the date 1669 he has written:

"Phisica est ars bene medendi.

"Est medicinalis Medicorum Regula talis
Ut dicant da, da, dum dicit Lanquidus. Ah! Ah!"

"The Doctor's practice is to aske for gayne
Even at ye time when men cry out for payne."

This is quoted on page 2 of the translator's preface to the reader in Nicholas Culpeper's *Physical Directory* (first edition, 1649). As Lambarde and Culpeper were both Kent men and contemporaries it is probable that the one copied from the other. The price of the book is marked as 2s. As a counterblast I have placed Dance's stipple of Alexander Russell, M.D., F.R.S., opposite to this, which has John Locke's lines on Sydenham engraved under it:

"Innocuas placide Corpus jubet urere Flammas
Et justo rapidos temperat Igne Focos
Extorsit Lachesi Culteos pestique Venenum
Abstulit et tantos non Sinit esse Metus."[1]

Both quotations bear somewhat on the articles on quackery, also in the same number. Richardson published a facsimile of Venner's portrait in 1801.—I am, etc.,

Appledore, Kent, Oct. 1st. F. WILLIAM COCK.

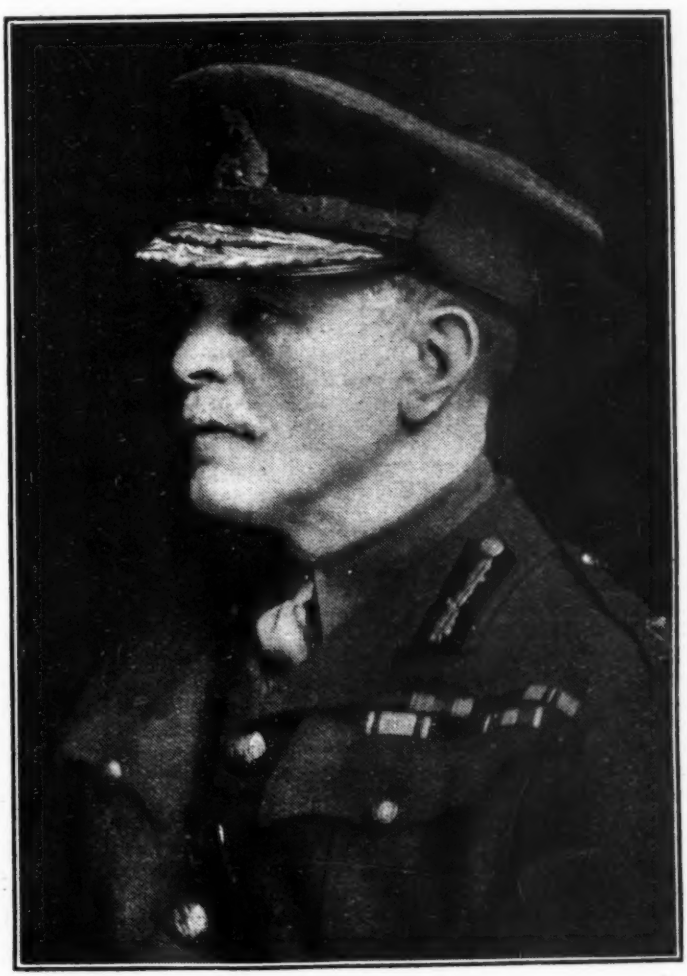
[1] See H. Fox's *Life of Fothergill*, pp. 118-120.

Obituary.

MAJOR-GENERAL SIR WILLIAM G. MACPHERSON, K.C.M.G., C.B., LL.D.,

Colonel Commandant, Royal Army Medical Corps.

By the death of Major-General Sir William Grant Macpherson, which occurred in London on October 15th, the Army Medical Service has suffered the loss of one of its most distinguished Colonel Commandants. As scholar, administrator, linguist, and author, he stood out prominently among his colleagues, but his chief contribution to his Service was that "he timeously prepared against the great day by promoting a proper adjustment between medical-military and staff requirements and by initiating the system of voluntary aid detachments throughout the country."* From the time he joined the army in 1883 he devoted himself heart and soul to the Service to which he belonged. Nor did his devotion terminate with his retirement in 1918 at the age of 60.



Yours ever
W. G. Macpherson

William Grant Macpherson, third son of the late Rev. William Macpherson, was born in the Manse of Kilmuir Easter, Rossshire, and among the northern hills the moulding of his character began. His early training imbued him with a deep sense of duty, a passion for work, a dour determination to succeed, and a love of thoroughness in all he did. He carried with him through life a delight in the open air and the keen observant eye of the schoolboy. His love of study soon manifested itself; it was the very essence of his being. He was educated at Fettes College, Edinburgh, and to him, one of the most illustrious former pupils of the College, fell the honour of unveiling its war memorial a few years ago. From Fettes he passed to the University of Edinburgh, where, in keeping with Scottish tradition and the trend of ideas at that time, he took up arts, specializing in classics. His real ambition, however, was to join the army, and with this end in view he combined arts with medicine, graduating with honours in classics in 1879, and M.B., C.M. in 1882. Having gained a travelling scholarship, he went to Tübingen and Leipzig, where he combined the study of medicine with that of German and logic.

To the shaping of his career he brought many gifts, natural and acquired. The driving force behind him was his inherent desire for knowledge, and many will remember the quick notes he made in his little black diaries—books that are still preserved. He was gifted with the art of expressing himself clearly and concisely, and his ready pen and ability to sketch helped him on more than one occasion when a difficult problem or position required elucidation. To these must be added a natural aptitude for learning foreign languages, which not only stood him in good stead throughout his career, but was indirectly of great benefit to the Medical Service itself, as he became an enthusiastic research scholar into the military medical systems of Continental armies, and was thus able to formulate the principles and regulations that guided the Medical Service safely through the great war.

His military career took him to all parts of the world, and wherever he went he acquired the language in order to understand better the problems of the country he was in. His first tour of foreign service was in India; this was followed by five years spent at Gibraltar, where, in addition to his routine duties, he acted as medical officer of health and for a time edited the *Gibraltar Chronicle*. While at Gibraltar he was sent in medical charge of Sir C. Euan Smith's Mission to Fez in 1892 and of Sir A. Nicholson's Mission to Morocco City in 1896, experiences he delighted to recall. On the completion of this second tour of foreign service he was detailed for duty at the War Office as D.A.D.G., A.M.D.2, and held that appointment from 1890 to 1902. During this term of office he was selected to attend the sixth and seventh congresses of Red Cross Societies at Vienna and at Petrograd respectively; he was secretary of the Central British Red Cross Committee from its foundation until 1902. While he appreciated the work in these important appointments, the desire for more exciting and practical work in the South African war was ever uppermost, but this could not be satisfied, and he had to be content with a mission to South Africa on the termination of his appointment at the War Office in 1902. The result of his investigations is embodied in his "Detailed Reports on Sanitary Conditions relating to proposed Cantonments and Encampments for the Troops in South Africa." In 1904 he was appointed S.M.O. North China Command, and while serving there he had the rare experience of being attached to the Japanese forces in Manchuria for two years during the Russo-Japanese war. His observations were recorded in concise, educative reports, which were published later in the "Medical and Sanitary Reports from Officers attached to the Japanese Forces in the Field." For his services to Japan he was awarded the Japanese War Medal, the Order of the Sacred Treasure (3rd Class), and the Meritorious Service Medal of the Japanese Red Cross Society.

On his return home he was appointed to the staff of the Director-General of Military Operations at the War Office, an appointment which perhaps gave him the keenest pleasure in his career and afforded him the greatest scope for his exceptional qualifications. It meant to Macpherson a storehouse of knowledge, periods of research, the friendship

* Appreciation by the Dean of the Faculty of Arts of the University of Edinburgh in presenting Sir W. G. Macpherson for the honorary degree of LL.D., July 10th, 1919.

of enthusiastic staff officers like General Nicholson, and missions to Panama and Cuba in 1908. To the combatant staff it brought new and forcible ideas on the value of an efficient medical service, and to the Medical Service itself an enhanced reputation among staff officers. In 1910 he was sent as P.M.O. to Malta, where he earned the thanks of the inhabitants by his strenuous efforts for the prevention of disease. The desire to enjoy the companionship of his only son, then soldiering in Quetta, made him readily accept, in the following year, the appointment of A.D.M.S. of the 4th Quetta Division, and the position as lecturer on military medical subjects at the staff college there from 1911 to 1914. His influence for good and his enthusiasm for medical staff tours and exercises became well known, and roused a real desire among all junior medical officers to serve in the Quetta Division so that they might gain some insight into problems about which their knowledge had hitherto been only superficial. When it became known early in 1914 that the then D.M.S. India, Sir Arthur Sloggett, had been appointed Director-General, Army Medical Services, it was no surprise to learn that he had decided to take Macpherson home as his deputy. So March, 1914, found him again in the War Office, this time as D.D.G., A.M.S., a position he held until October of that year.

His service during the great war was continuous, first as Adviser to the Indian Corps, then as D.M.S. of the First Army in France until October, 1915, followed by a period as D.M.S. of the Force in Salonika until March, 1916, when he returned to France as D.D.G.M.S., G.H.Q., 1st Echelon, an appointment he held until June, 1918, when he was obliged to retire, having reached the age limit. While Adviser to the Indian Corps he had actually visited his son, then serving in a Gurkha regiment, when news was brought him a few hours later that he had been killed in action at Festubert. This was the greatest sorrow of his life and one that he never mentioned.

Several features of his administration during the great war are especially noteworthy. His preparations for big operations were carried out to a point of thoroughness in keeping with his character. Concerted medical opinion prior to an engagement was to him of the highest importance, and he was instrumental in bringing together the representative Ds.M.S. of armies to discuss the operations. He viewed with dismay the constant wholesale evacuation of slightly wounded and sick casualties to the United Kingdom, and begged the authorities at home to provide sufficient beds in France to meet this need. The shortage of hospital accommodation, which had been greatly felt at the battle of the Somme, became so acute before the advance to the Hindenburg line that he was sent on a special mission to the Adjutant-General at the War Office to explain the position. Before the battle of Cambrai he fought hard to obtain such information from the General Staff as would enable the medical services to make adequate preparations for the heavy casualties expected, and thus avoid a tremendous wastage in man power. In dealing with the medical services in Salonika he found that a complete reorganization of medical transport was necessary, because the ordinary motor ambulance wagons and cars were of little or no use for front line work in that country. He early realized the danger of malaria to the force, and put forward a most comprehensive scheme for its prevention.

For his services he received many honours and distinctions. Prior to the great war, in addition to his Japanese decorations, he was made a Knight of Grace of the Order of St. John of Jerusalem in 1901, was awarded the C.M.G. in 1902, and was appointed Honorary Physician to the King in 1912. During the war he was mentioned nine times in dispatches, was made a C.B. (Military), a Commander of the Legion of Honour and Crown of Italy (3rd Class) and a K.C.M.G., and was awarded, in 1922, the Distinguished Service Medal of the United States of America. In July, 1919, he received from the University of Edinburgh the honorary degree of LL.D., an honour that appealed to all the sentiment in Macpherson because it hall-marked the erudite tendency he had steadfastly developed from his student days, and was received amidst warm-hearted and friendly fellow students who had likewise won fame and honour.

The years that followed his retirement were devoted to the many public and private interests that filled his life. He was editor-in-chief of the official *Medical History of the War*, compiling, with the help of collaborators, eleven volumes in the short space of four years. He had been a member of the British Medical Association for many years, was the representative of the R.A.M.C. on the Council from 1921 to 1926 and a member of the Naval and Military Committee from 1921 to 1927. He was a member of the Committee on the Expansion of the Army Medical Service in case of National Emergency from 1921 to 1923; of the Committee on the Royal Commission on the Superior Civil Services in India, 1924-26; and chairman of the Special Committee on Tests for Drunkenness, 1926-27. On numerous occasions he represented His Majesty's Government at the Convention of Red Cross Societies at Geneva. He reviewed many books, and was a frequent contributor to works of reference and journals. In particular, we would wish to acknowledge here the readiness with which his wide knowledge, command of languages, and skilled pen were put at the disposal of the BRITISH MEDICAL JOURNAL.

But what of the man himself? His lifelong principles were duty first and sham or make-believe nowhere. Few men had a kinder or gentler disposition than Macpherson, and, like the true Scot that he was, he hid behind a courteous manner a shy reserve and an extraordinary diffident and sensitive nature. Though he had his disappointments they did not sour him or rob him of his zest for and appreciation of life. In his entertainment of friends at the Savile Club, the Junior United Services Club, at a restaurant, or at home, he was the genial host, ever ready with merry jest and light-hearted conversation to make his artistic dinner a success. In the realm of sport he was no onlooker. He was champion boxer and one of the best gymnasts of his year at Edinburgh University. At Gibraltar he raced, hunted, and played polo, while at Quetta his racing matches with the present Adjutant-General, Sir Walter Braithwaite, one of his greatest friends, brought him his most valued trophy—a cup. At golf there was no keener competitor in the Generals' Competition at the Army Golf Meeting or in the British Medical Association golf tournament than Sir William Macpherson, and no one enjoyed more than he the matches played during his annual golfing holidays at Gullane with Sir Harold Stiles, Professor Leith, and Sir Oliver Lodge. His pride and pleasure were unbounded when his Corps won the Army Championship Cup at St. Andrews in 1926, and to the golfing members of the R.A.M.C. his enthusiasm and joy of life have brought *esprit de corps* and delight in comradeship. If the last two months of his life were trying, he bore them without complaint, and to the very end he was the gallant, great-hearted officer who well deserved the name of "Tiger Mac" for his courage, energy, strength, and tenacity of purpose.

He married first Miss E. A. Clunas, daughter of Mr. J. Clunas of New Orleans; she died in 1907. In 1910 he married Geraldine, youngest daughter of General Sir John Doran, K.C.B., of Ely House, Wexford, and to her and his other relatives we extend our whole-hearted sympathy.

We are indebted to Sir ANTHONY BOWLBY, Bt., K.C.B., who was Advising Consulting Surgeon at G.H.Q., France, when Macpherson was D.D.G. there, for the following tribute:

I am glad to have the opportunity afforded me by the BRITISH MEDICAL JOURNAL of alluding to the work done in the war by Sir William Macpherson. He was probably one of the best known men of the Army Medical Service, and there must be very many who served in France or in Salonika who remember him and his work. At the beginning of the war he was Deputy Director-General in London, but in November of 1914 he came out to France and acted as medical adviser to the Indian contingents for a short time. But it was on the formation of the First Army early in 1915 that he had the opportunity of administering a medical service himself. He served as D.M.S. First Army during the fighting in March at Neuve Chapelle, and in the May attack at Festubert. Later on

the First Army made the attack at Loos, and shortly after this Macpherson was promoted to be D.M.S. in charge of medical affairs, Salonika. Of his work in Salonika I cannot speak from any personal experience, but after remaining there for about six months he returned to France to take up the appointment of D.D.G. under Sir Arthur Sloggett, in the place of General O'Donnell, who had been appointed Director-General in India.

It was while he was attached to the First Army that he first became closely associated with the civilian members of the medical profession, who by this time were serving at the front in considerable numbers, and it was in association with the Consulting Surgeon of the First Army (Sir Cuthbert Wallace) that the first steps were taken in that army to improve the opportunities for operative work at the front, and it was at the battle of Loos arrangements were made for the first time for an advanced operating centre in support of the casualty clearing stations. It was in the winter of 1914-15 that "trench feet" first came into prominence as a very disquieting source of invaliding, and thousands of men in the British Expeditionary Force were incapacitated for service for many months. Macpherson was one of the first to take most energetic measures to prevent this drain upon the army, and I think that the success which attended his efforts was always a source of much gratification to himself.

It was, however, after his return to France as Deputy Director-General in 1916 that he became so well known to all medical officers on the British front, and it is pleasant to recall in what a friendly way everything worked at advanced G.H.Q. It will be of interest to many readers to recall the G.H.Q. staff at that time. Sir Arthur Sloggett was D.G., Macpherson was D.D.G., and the chief staff officers were Majors Buckley, Martin, Morgan, and Black. It was with this staff that I was associated as "Advising Consulting Surgeon," and nothing could have been more smooth than the working of the office. Macpherson was the pivot on which most arrangements turned; the general direction was under Sir Arthur Sloggett, but Macpherson acted in a position comparable with that of a chief of the staff to his general, and it was largely through him that final orders were drafted and that the commands of the Director-General were translated into action. It was about the time when he was appointed D.D.G. that special efforts were being made to develop the surgery of the front, and before he returned from Salonika steps had already been taken to keep the casualty clearing stations as near to the front as possible, and also to add to their staffs operating surgeons of experience and nurses, and to increase their equipment in view of the coming battle of the Somme. The result was that in 1916 a very large percentage of all the wounded were operated upon at the front, and from that time onwards constant improvements were being made in arrangements for the early treatment of wounded men. In all these improvements Macpherson was one of the chief actors, and it was during the battle of the Somme that the system of reinforcement by "surgical teams"—which was such a success—was initiated at the casualty clearing stations. It must also be remembered that not only were the casualty clearing stations at that time much better equipped, but that, as the war went on, the surgical work of the field ambulances also was greatly improved, and arrangements were made for the splinting of fractured limbs as soon as possible after the men were wounded. In all these improvements Macpherson bore a leading part, and it was largely owing to his example and that of his colleagues at G.H.Q. that the liaison between the R.A.M.C. and the civilian surgeons became so friendly and smooth.

But there was another matter in which Macpherson assisted very materially the easy working at the front of the Army Medical Department, and that was in maintaining close and friendly relations with the combatant command. He was very frequently the confidant of army commanders or of G.H.Q. itself, and was thus often enabled to make those arrangements before a battle which allowed casualties to be anticipated and their treatment prepared for. He was all the more useful in this respect because as far as Army Regulations were concerned he might have been described as a walking dictionary, and although he was sometimes accused of paying too much attention to red tape there is no doubt that he never allowed any such thing to interfere with the efficient treatment of the wounded or sick soldier, whose interests were always in his mind. I remember very well how he pointed out to a civilian medical officer during a battle that in the interests of the wounded man it was most necessary that the details of his wound and the date on which he was wounded should be carefully noted—and this for the sake of the man himself, who might possibly have some difficulty in securing a wound pension if his name did not appear among the returns of the wounded.

He was a good disciplinarian, but never a harsh one; while he was always good tempered, very accessible, and open to argument. He was fortunately blessed with a good constitution and robust health, and never appeared to be overtired, however long the day might be. It was a great disappointment to him when the time came for Sloggett and himself to retire from active service just before the termination of the war; but his work was not yet done, for after serving as D.M.S. in the Southern Command in England he was selected to act as editor-in-chief of the official *Medical History of the War*, and it is not too much to say that it was mainly owing to his energy, ability, and literary accomplishments, that the medical history was completed within three years, and that owing to his guidance it attained the very high reputation which it holds. It is indeed noticeable that this medical history was completed before similar histories of other combatant nations had been well begun. Macpherson had a very full life and earned distinction in many capacities in the Army Medical Corps, but it is his work at the front during the great war, and his further service as an historian after the war was ended, that will make his name go down to posterity. He will be deeply regretted by his many friends.

At the funeral service in Holy Trinity Church, Brompton, on Wednesday, October 19th, the Council of the British Medical Association was represented by Sir Richard Luce, M.P., the Naval and Military Committee by Major-General Sir Alfred Blenkinsop, the headquarters' staff of the Association by Dr. C. Courtenay Lord (Assistant Medical Secretary), and the Journal by Dr. N. G. Horner (Assistant Editor). A memorial service will be held in the chapel of Queen Alexandra's Military Hospital, Millbank, on Tuesday next at noon.

[The photograph reproduced is by Messrs. Elliott and Fry, London.]

SIR JOHN O'CONOR, K.B.E., M.D.,

Senior Medical Officer, British Hospital, Buenos Aires.

The death of Sir John O'Conor, senior medical officer of the British Hospital, Buenos Aires, is announced by the Exchange Telegraph Company. He was the son of Mr. Abraham O'Conor of Carrick-on-Shannon, and was born on December 21st, 1863. He received his medical education at Trinity College, Dublin, where he graduated M.B. in 1886, and M.D. and B.Ch. in 1890. After holding the office of house-surgeon at the Royal Portsmouth Hospital from 1887 to 1889, he went out in 1890 to Buenos Aires to be resident medical officer at the British Hospital there, an institution maintained by the British community, but admitting patients of all nationalities; four years later he became senior medical officer. He established a great reputation as a surgeon in the Argentine, and his name became well known in this country, owing to his numerous contributions, always highly practical, published in this and other medical journals. Though he made his home in Argentina, he remained ardently attached to the fortunes of the British Empire, and during the war was chairman of the British Patriotic Administrative Committee and of the local Military Commission in Argentina. In 1920 he received the honour of K.B.E. in recognition of this work.

We are indebted to Dr. Bernard Potter, who was well acquainted with Sir John O'Conor and visited him at Buenos Aires only last spring, for the following tribute to his memory:

By the death of Sir John O'Conor at the comparatively early age of 63, the city of Buenos Aires loses one of the

most prominent members of its British community. His great work was done at the British Hospital. He had long been the life and soul of this institution, and when I visited the wards with him only in May this year his interest, enthusiasm, and operative ability showed not the least sign of relaxation or slackening. His experience must have been immense and unique. There was always open to him a great field of labour, for to this hospital the accident cases of the Buenos Aires Great Southern Railway, among others, were brought. He lived in a flat overlooking the splendid Avenida de Mayo in the centre of the city, and to visitors there he delighted to show specimens of his wonderful colour photography; this was a great hobby with him, and his results were remarkable. The photographs were mostly taken at his country seat in the lake district, named by the Indians Nahuel Huapi, in the province of Rio Negro, some seven hundred miles to the south-west of Buenos Aires. This beautiful place is in the foothills of the Andes, at the mouth of the pass through which the Chileans would, if unhappily they undertook such an enterprise, descend to attack the Argentines. Here he would give himself up to hospitality, and revel in it during the summer months of December and January, escaping the heat of Buenos Aires. In Buenos Aires he entertained largely and lavishly at the Jockey Club, where he was much more at home than at the English or the Strangers' Club. He mixed freely and easily with the Argentines, and had none of the aloofness which somewhat handicaps the British community. He knew more than any other foreigner the mind of the Argentine; he could speak the language fluently, and mingled freely with them. He would often refer with pride to the place the British occupied in the estimation of the Argentines. Indeed, he would frequently reiterate that the British were easily first in the regard and affection of Argentines, and the only foreigners who really counted. He was a typical Irishman —he was witty, outspoken, a good raconteur, and impatient of contradiction. His position in his adopted country suited him well, for he loved to lead rather than to follow. His war work was worthy of one who held the highest ideals of the British Empire. I well remember a striking cartoon O'Conor drew to impress on each man his value in the structure and making of the army. He had two sons, of whom one, a promising officer in whom he had taken the greatest pride, died in the war. Sir John O'Conor was possessed of a vigorous and striking personality. He was a great and versatile surgeon, an Imperialist contributing as much as any man to the prestige of the British in Argentina; above all, he was possessed of a wonderful charm and kindliness, which have endeared him to a vast circle of friends, both British and Argentine.

Dr. J. G. Blackman of Portsmouth, who knew Sir John O'Conor during his time at Portsmouth, writes of him as follows:

John O'Conor was full of enthusiasm for the new era then dawning upon medicine and surgery. His ardent zeal was so contagious that to be associated with him was a post-graduate education. As a surgeon he was at once daring and cautious, yet very original. His many communications to the Journal show how generously he strove to disseminate his ripe experiences. His comparatively early death is a heavy blow to the British community of Buenos Aires, as well as to the profession he so richly adorned.

Dr. William Cameron Macaulay, who died in the Middlesex Hospital on September 1st, was born in 1868, and owing to straitened family circumstances had to begin earning his livelihood by teaching at the age of 17. In 1895 he obtained the degree B.A.Lond. with honours in English, and remained in the teaching profession until 1898, being an assistant master at the Westminster City School and tutor in early and mediaeval English in the University of London. He entered the Middlesex Hospital as first entrance scholar in 1898, when he was 30 years old, and secured almost every available scholarship and prize; in one year, 1904, he was awarded the John Murray Gold Medal and Scholarship, the second Broderip Scholarship, the Governor's Prize, the Leopold Hudson Prize, and the Hetley Clinical Prize. In 1903 he graduated M.B.Lond. with first-class honours in gynaecology, and second-class honours in forensic medicine, and obtained the diplomas M.R.C.S., L.R.C.P. During his medical education he found time to continue teaching in English, and for several years he held the post of demonstrator of chemistry in the Middlesex Hospital medical school. He held a resident obstetric appointment at the Middlesex Hospital for a year and then commenced practice at Brixton, where he worked assiduously until within a month of his death, save for the entire period of the war, during which he was serving abroad with the 2/5th Field Ambulance. He was an ardent Territorial and was second in command of this ambulance from its formation to its disbandment. He saw active service in France, Salonika, Macedonia, Egypt, Palestine, and Syria, and was mentioned in a dispatch by General Allenby for gallant and distinguished services in the field. Other appointments held by him were those of medical referee to the Ministry of Pensions, and to the Commonwealth of Australia migration scheme. He was a member of the British Medical Association. He died in his old hospital tended by old friends and classfellows, and will be long remembered as a brave man, who faced with the quiet fortitude and courage which befitted a soldier the desperate operations for the malady from which he was suffering. He is survived by a widow and one son, Dr. H. M. Cameron Macaulay, who is deputy county medical officer of health for Middlesex. Mr. Victor Bonney writes: I should like to pay a tribute to the late Dr. William Cameron Macaulay, whose premature death is a real loss to the profession. He entered his calling late, so that though a student under me, he was considerably older than the rest of his classmates. He was a very brilliant man, and possessed ability which would have fitted him for any position, however high. He greatly distinguished himself in all his examinations, and, but for an oversight in his paper, would have obtained the gold medal in obstetrics at the London University. As too often happens to men of the greatest promise, circumstances compelled him to take up a line of work where his great gifts were hidden from the recognition of the general public. That he did splendid though unostentatious work, I can vouch for, and his noble and steadfast character enabled him to meet the tragic fate that befell him with extraordinary courage and fortitude.

We regret to record the death of Dr. Robert Corfe, on September 25th, at the age of 57, after a short illness. He received his medical education at St. Mary's Hospital, where he graduated M.B.Lond. in 1894, and obtained the diplomas M.R.C.S., L.R.C.P. He held the appointments of house-surgeon and obstetric officer to St. Mary's Hospital, was resident medical officer at the Ipswich General Hospital, and during the Boer war he acted as civil surgeon. In 1902 he settled in Greenwich, where he carried on practice for the past twenty-five years, and was physician to out-patients at the Miller General Hospital. He took a keen interest in Church activities, and had been churchwarden at the parish church for many years. At the outbreak of the late war he was called up as a Territorial officer, R.A.M.C., and served in France and Salonika throughout its duration, retiring with the rank of lieutenant-colonel. He was a lecturer for the St. John Ambulance Association, and held local clinic appointments under the London County Council. He was a member of the executive committee of the Greenwich and Deptford Division from 1923 to 1926, and was chairman of the Division in 1926-27. His death will be keenly felt throughout the district, where his medical skill and kindly disposition had made him greatly beloved. He leaves a widow and two daughters.

Dr. Alfred James Meyrick Paget, who died on September 15th, after many months of failing health, was the third son of Sir George Edward Paget, K.C.B., formerly Regius Professor of Physic in the University of Cambridge. He was born at Cambridge in 1869, and entered s.s *Conway*, a training ship for the merchant service, but after a year's work was disabled by a severe accident. His love of shooting then led him to try ranching as a premium

student in Canada, but finding this unsatisfactory he returned at the age of 19 with a desire to enter the medical profession. He obtained the M.B. degree at Edinburgh in 1895 and proceeded M.D. in 1898. His health proving unequal to the strain of general practice, he took service in the following year under the Foreign Office and became a medical officer for the Uganda Protectorate. He got no further than Nandi, where he lay for two months dangerously ill with malaria. He was invalided and then transferred to Kenya, where he spent four years of pioneer work in an unsettled country. From Kenya he went to Somaliland as senior medical officer, and remained there till 1916, through the troubled years of the "Mad Mullah's" activities. He received the Somaliland medal for services during military operations, especially for attending and rescuing Colonel Summers when wounded. His administrative work was highly praised, and he did much towards starting hospitals and training native attendants. In 1916 he was invalided, and shortly afterwards joined the R.A.M.C. as a temporary lieutenant; he worked in the Lord Derby Hospital, Warrington, and afterwards at Ripon. From 1918 to 1925 he took temporary duty as a neurological expert, chiefly on pensions boards in London. In May of this year his health finally broke down. He leaves three sons, of whom Dr. M. Y. Paget is a member of the medical profession.

Dr. THOMAS O'KELLY of Chipping Norton, who died on September 25th, at the age of 70, received his medical education in Dublin and Queen's College, Galway. He graduated M.D. of the Queen's University of Ireland in 1879, and obtained the diplomas L.R.C.S.Ed. and L.M. in 1883. He was medical officer and public vaccinator in the Chipping Norton Union, and in addition carried on a large country practice. For many years Dr. O'Kelly took a prominent part in the work of the Oxford Division of the British Medical Association. He was a member of the Oxford and District Branch Council from 1892 to 1894, and of the Oxford and Reading Branch Council from 1913 to 1922. He was also chairman of the Oxford Division in 1914, and vice-chairman of this Division from 1915 to 1921. Dr. William Collier, who was President of the Association when it met at Oxford in 1904, writes: The late Dr. O'Kelly joined the Oxford Branch of the British Medical Association soon after its institution in 1885, and proved himself one of its most enthusiastic supporters; he very rarely missed a meeting of the Branch and took an active share in the discussions. No general practitioner ever went to greater trouble to keep up with advances of medicine, as year by year he spent a portion of his holiday visiting the hospitals in London and learning what he could. Needless to say he built up a large and widespread practice in the neighbourhood of Chipping Norton, and was much esteemed and respected by his neighbours, both rich and poor. He gave freely of his best to all. A somewhat long and painful illness was borne with great courage and cheerfulness, and his loss to the neighbourhood is very great.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE

AT a congregation held on October 15th the following medical degrees were conferred:

M.D.—J. C. N. Harris,* L. P. Lockhart.
M.B., B.CHIR.—H. J. Burrows, N. H. R. Hatfield, G. P. Chandler, M. S. Dewhurst.
M.B.—A. C. Copley.

* By proxy.

The following candidates have been approved at the examination indicated:

D.P.H. AND HY.—*Part II*: L. A. P. Anderson, H. M. Ayres, A. Gilbert, H. M. Osman, M. H. M. Ragab, K. N. Segal, G. Shehata, H. Singh, Mary Y. McA. Stevenson, H. C. Wilkinson.

UNIVERSITY OF LONDON.

UNIVERSITY COLLEGE.

THREE lectures on the history of medicine will be given at University College Hospital Medical School by Dr. Charles Singer on syphilis (November 7th), influenza (November 14th), typhoid fever (November 21st). The lectures, which will be given at 4.15 p.m. on each day, will be illustrated by lantern slides, and are open to all medical students of the University of London.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.

The annual dinner of past and present students of University College Hospital was held at the Hotel Cecil on October 14th. Sir George Blacker presided over a large gathering. In the course of his report on the past year the dean, Dr. A. M. H. Gray, mentioned that the centenary of the Medical Faculty of University College fell in 1928. With its new obstetric and aural hospitals University College Hospital now possessed 500 beds, and in the matter of buildings and equipment was second to no hospital in London. Among the investigations carried out in the Medical School during the past year he mentioned the synthesis of thyroxin by Dr. Harrington, a notable achievement in biochemistry. In concluding he referred to the severe loss the hospital had recently sustained in the deaths of its chairman and vice-chairman, Sir Ernest Hatch and Lord Ormmore and Browne.

VICTORIA UNIVERSITY OF MANCHESTER.

THE Lancashire County Council has increased its annual grant to the University from £4,000 to £5,000, in addition to the supplementary grant made by them for extramural work.

The Cheshire County Council has renewed its annual grant of £1,000.

Dr. R. B. Wild, who has recently retired from the Leech Chair of Materia Medica and Therapeutics, has presented £250 for the endowment of a prize in pharmacology.

Professor J. S. B. Stopford has been appointed the representative of the University on the General Medical Council.

The following appointments have been made: Assistant lecturer in bacteriology, Mr. C. A. McGaughey, M.R.C.V.S.; demonstrator in bacteriology, Mr. E. St. G. Gilmore, B.Sc., M.B., Ch.B.Manch.; demonstrator in pathology, Mr. H. L. Sheehan, M.B., Ch.B.Manch.

UNIVERSITY OF GLASGOW.

THE following degrees were conferred on October 17th:

D.Sc.—John Glaister, M.D.
M.D.—*Amy M. Fleming, *Georgina Murdoch, A. M'A. Scott.

* With honours.

The degrees of M.B., Ch.B. were also conferred upon the successful candidates whose names were published in our issue of October 8th (p. 666).

The Brunton memorial prize awarded to the most distinguished graduate in medicine for 1927 has been gained by W. A. Mackey.

The West of Scotland R.A.M.C. memorial prize for the candidate with the highest aggregate marks in medicine, surgery, and midwifery in the final M.B., Ch.B. examination held during 1927 has been awarded to Margaret W. Thomas.

UNIVERSITY OF WALES.

THE following candidates have been approved at the examination indicated:

D.P.H.—*Part I*: C. J. Donelan, Nancy K. Gibbs, Dilys Jones. *Part II*: C. W. Anderson, J. D'A. Champney, C. J. Donelan, Nancy K. Gibbs, Dilys Jones, E. M. Jones.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

A QUARTERLY Council meeting was held on October 13th, when the President, Sir Berkeley Moynihan, was in the chair.

Annual Report.

The annual report of the Council was approved and will be placed before the Fellows and Members at the annual meeting on Thursday, November 17th.

Direct Representation of Members on the Council.

The Committee on the Annual Report of the Council reported that it had examined the answers received in reply to the circular addressed by the Council to the Fellows with the object of eliciting their opinion regarding the direct representation of Members of the College upon the Council. Circulars were issued to 1850 Fellows, and 1080 replies were received. The question asked was, "In your opinion is it desirable that Members of the College should have direct representation upon the Council?": 846 Fellows voted "No" and 234 (including 6 conditional answers) voted "Yes"; majority against, 612.

Lectures.

Sir H. J. Waring was appointed to deliver the next Hunterian Oration. The Bradshaw Lecture will be delivered by Sir Cuthbert Wallace on November 10th, at 5 p.m., on "Enlarged prostate: a review." The Thomas Vicary Lecture will be delivered by Dr. George Parker on November 3rd, at 5 p.m., on "The early development of hospitals."

Bicentenary of John Hunter.

It was decided to celebrate the bicentenary of the birth of John Hunter on February 14th, 1928.

Honorary Curator.

Mr. C. J. S. Thompson, formerly curator of the Wellcome Historical Medical Museum, was asked to act as honorary curator

of the historical section of the museum (including surgical instruments and appliances) in succession to the late Mr. Alban Doran, or the ensuing year.

Gilbert Blane Gold Medal.

The Sir Gilbert Blane Gold Medal has been awarded to Surgeon Lieut.-Commander Allan Watt McRorie, M.B., R.N. Promotion Examination, 1927.

The Late Mr. Thelwall Thomas.

A vote of condolence was passed on the death of Mr. William Thelwall Thomas, M.B.E., Member of the Council. The vacancy in the Council thus occasioned will be filled up at the election of members of the Council in July, 1928.

Advancement of Gynaecology and Obstetrics in New Zealand.

Leave of absence was granted to Mr. Victor Bonney to assist in the inauguration of a new society in New Zealand for the advancement of gynaecology and obstetrics. Mr. Bonney was asked to convey the best wishes of the Council of the College to the Medical Association of New Zealand for their continued prosperity and for the success of the new section to be formed.

CONJOINT BOARD IN SCOTLAND.

THE following candidates have been admitted Diplomates in Public Health:

H. Suhrawardy, W. B. Moore, A. E. W. McLachlan, J. O. Hamilton, Jeannie Kean, C. K. Robertson, J. Douglas, A. McFarlane, A. Gardiner.

E eanor B. Bone has passed Part I of the D.P.H. examination.

The Services.

Surgeon Commander H. E. Y. White, C.V.O., O.B.E., has been appointed to H.M. Yacht *Victoria and Albert*. He entered the service in July, 1913, and after serving throughout the war was appointed to H.M.S. *Renown* in 1919, in which ship he did duty during the Prince of Wales's world tours. He was for two years in charge of the sick quarters at the Royal Naval College, Dartmouth. He again attended upon the Prince of Wales during his South African tour in 1925 in H.M.S. *Repulse*. After serving as principal medical officer of H.M.S. *Queen Elizabeth* he was appointed to H.M.S. *Renown*, in which the Duke and Duchess of York made their recent world tour.

DEATHS IN THE SERVICES.

Lieut.-Colonel Frederick William Wright, D.S.O., Bengal Medical Service (ret.), died at Bournemouth on September 9th, aged 76. He was born on December 7th, 1850, the son of Robert John Wright, land agent, Thorpe, Norfolk, and educated at Edinburgh, where he graduated as M.B. and C.M. in 1872. Entering the I.M.S. as surgeon on July 1st, 1873, he became surgeon lieutenant-colonel after twenty years' service, and retired on December 7th, 1905. His entire service was passed in military employ. He served in the Afghan war of 1878-80, in the actions at Jagdallak and Chihildakhteran, in the march under General Roberts from Kabul to Kandahar, in the battle of Kandahar, and in operations against the Marris, receiving the Afghan medal with a clasp, and the special Kabul-Kandahar bronze star; and in the Burma campaign in 1886-88, in the operations of the 2nd and 4th Brigades, when he was mentioned in dispatches, in G.G.O. No. 434 of 1887, and received the frontier medal with two clasps, and the D.S.O. from July 1st, 1887; China, 1900, medal; and North-West Frontier of India, Waziristan campaign, 1901-02, medal with clasp. On January 4th, 1919, he was granted a good service pension. In 1914 he married Edith Bella Freeman of Dover.

Major Christopher Martin Ingoldby, R.A.M.C., died at Sekondi, Gold Coast, on June 22nd, aged 39. He received his medical education at the London Hospital, and took the M.R.C.S. and L.R.C.P.Lond. in 1912. He entered the army as lieutenant on January 26th, 1912, attained the rank of major on January 26th, 1924, and was seconded for service in West Africa on October 8th, 1924. He served throughout the recent great war, and was mentioned in dispatches in the *London Gazette* of March 12th, 1918.

Surgeon Captain Michael Joseph Laffan, R.N. (ret.) died in Guernsey on August 13th. He was educated at the Catholic University, Dublin, and graduated B.A., M.B., B.Ch., and B.A.O. in the Royal University of Ireland in 1901. After serving as senior resident medical officer in the Mater Misericordiae Hospital, Dublin, he entered the navy, attaining the rank of surgeon commander on November 21st, 1916, and retiring, with an honorary step in rank as surgeon captain, on August 26th, 1926. He served in the recent great war, receiving the medal.

Surgeon Lieut.-Commander John Stephen McGrath, R.N., died recently at Glasnevin, Dublin. He graduated as M.B., Ch.B., and B.A.O. in the National University of Ireland in 1917 and, entering the navy soon afterwards, obtained his rank on May 1st, 1923. He served during the recent great war, receiving the medal.

Lieutenant Anthony Keppel Jackson Finch, R.A.M.C., died at Allahabad on September 5th, aged 25. He was born on June 13th, 1902, the only son of Surgeon Rear-Admiral Finch, R.N., and educated at St. Mary's, taking the M.R.C.S. and L.R.C.P.Lond. in 1925. He took a temporary commission as lieutenant in the R.A.M.C. on October 12th, 1925, and was confirmed in that rank from February 3rd, 1926.

Medical News.

THE annual dinner of the Royal Society of Medicine will be held on Wednesday, November 16th, at 8 o'clock, at the Hotel Victoria, Northumberland Avenue.

THE annual general meeting of the Medical Sickness Annuity and Life Assurance Society, Ltd., will be held at the offices of the company, 300, High Holborn, W.C.1, on Monday, November 14th, at 4 p.m.

DR. H. C. CAMERON, physician and physician in charge of the department of diseases of children, Guy's Hospital, will deliver the Lloyd Roberts Lecture at St. Mary's Hospitals, Whitworth Street West Branch, Manchester, at 4.15 p.m., on November 1st. The subject is "The child in general practice: a study both of temperament and of disease."

THE Fellowship of Medicine announces that Mr. Herbert Paterson will deliver a lecture, entitled "Surgical Hints," at the Medical Society, 11, Chandos Street, Cavendish Square, on October 24th, at 5 p.m. On the same day, at 2 p.m., Mr. J. B. Hunter will give a surgical clinical demonstration at the Royal Northern Hospital; and on October 25th there will be a medical clinical demonstration at the same hospital by Dr. Bruce Williamson at 3 p.m. Mr. Cunningham will give an ophthalmic clinical demonstration at the Central London Ophthalmic Hospital on October 27th, at 4 p.m. The lecture and the demonstrations are free to medical practitioners without fee. From October 24th to November 5th there will be a special course in ophthalmology at the Royal Eye Hospital every afternoon at 3 p.m. During November there will be the following courses in medicine, surgery, and the specialties at the Hampstead General Hospital, from 4 to 6.30 p.m., October 31st to November 12th; a similar course at the London Temperance Hospital, November 21st to December 3rd; in medicine, surgery, and gynaecology at the Royal Waterloo Hospital, occupying the afternoons and some mornings, November 14th to December 3rd; an all-day course in diseases of the chest at the Brompton Hospital, from November 7th to November 12th; in neurology at the West End Hospital for Nervous Diseases, November 21st to December 17th, daily at 5 p.m.; in proctology at St. Mark's Hospital, from November 28th to December 3rd; an afternoon course in urology at St. Peter's Hospital, November 14th to 26th; and a course in venereal diseases at the London Lock Hospital, October 31st to November 26th, occupying the afternoons and some evenings. Copies of syllabuses are obtainable from the Secretary of the Fellowship of Medicine, 1, Wimpole Street, W.1.

AT the meeting of the West Kent Medico-Chirurgical Society to be held on November 11th, at the Miller General Hospital, Greenwich, Dr. Edward Mapother will read a paper on "Co-operation by the profession in the treatment of mental disorder." The Purvis Oration will be delivered on December 9th by Mr. Victor Bonney on "Puerperal sepsis."

IN view of the retirement of Dr. Joseph Priestley on October 31st from the post of medical officer of health for Lambeth, after thirty-two years' service, the Borough Council at its meeting on October 13th adopted a motion recording its great appreciation of his high professional and organizing ability, combined with indefatigable zeal in promoting the health and welfare of the borough—"services which have placed it in the forefront of the large boroughs with regard to efficiency in sanitation and the lessening of the mortality rates." Invitations have been issued by the Mayor and Mayoress of Lambeth (Dr. and Mrs. R. S. Pearson) to a reception at the Town Hall, Brixton Hill, at 4 p.m., on Thursday next, October 27th, when a presentation will be made to Dr. Priestley by his fellow practitioners of Lambeth.

DURING the first thirty-three weeks of 1927 the number of cases of diphtheria in Prussia was 13,632 with 749 deaths, as compared with 12,192 cases with 576 deaths in the corresponding period of 1926.

THE Society of Miniature Rifle Clubs calls attention to the fact that Captain C. Heygate Vernon, the King's prizeman at Bisley last July, has been largely responsible for the inauguration of a miniature rifle club at Bournemouth. Other medical practitioners interested in this pastime include Dr. F. H. Kelly, who is an active member of the Imperial Brighton and Hove Rifle Club, and Dr. W. J. Bethune, who belongs to the Inverness Club. Dr. P. G. Harvey, of Monmouth, presided recently over a meeting of the members of the Monmouth and Chepstow Rifle Clubs, which was convened for the purpose of founding a county rifle association for Monmouthshire. It is suggested that similar rifle clubs might well be started at medical schools under the auspices of this society, and that matches might be arranged between them. Information and assistance may be obtained from the secretary of the Society of Miniature Rifle Clubs, 15, Arundel Street, Strand, W.C.2.

The Bribery and Secret Commissions Prevention League, of which Lord Lambourne is president, is appealing for members and increased funds; on November 4th the Lord Mayor will preside at a meeting at the Mansion House in celebration of the twenty-first anniversary of its foundation. Bribery, it is said, is still rampant in this country, and more power is desired to counter this disgrace to trade by calling attention to the work of the League and making the law as regards bribery known throughout the land. One of the great successes of the League was known as the canteen case, in which seventeen persons were convicted. As a result of the case the whole canteen system was reorganized. The address of the League is 22, Buckingham Gate, S.W.1.

A medical tour is being organized by the Société Médicale du Littoral Méditerranéen. It will extend from December 30th, 1927, to January 7th, 1928, and will include Hyères, St. Raphael-Valescure, Grasse, Cannes, Nice, Beaulieu, Monaco, Monte Carlo, Mentone. Full particulars can be obtained from the Federation of the Health Resorts of France, 19A, Tavistock Square, London, W.C.1.

The September issue of the *Kenya and East African Medical Journal* contains an article on malaria, which is the first of a series of popular accounts of the common diseases of East Africa, with hints on general lines of treatment for those out of reach of immediate medical assistance.

The fifteenth annual report of the British Dental Hospital illustrates the progress that has been made since its foundation in 1911. Besides the original centre at Camden Road, London, N.W., dental treatment centres are operating at Lewisham Park, Clapham Common, Hammersmith Road, and Holborn. Twelve boroughs have maternity and child welfare and tuberculosis dental clinics, and there is one minor ailment centre at Lewisham. The attendance of patients at the treatment centres during 1926 shows a considerable increase on the figures of the previous year, and many public lectures on oral hygiene are being given.

A severe epidemic of infantile paralysis has recently broken out in Rumania. A large number of cases has also been reported lately in Germany, especially in Saxony.

As the claim of Dr. Dorothy C. Logan to have swum the English Channel was mentioned last week it ought perhaps to be placed on record that she has since withdrawn it, explaining that she perpetrated the hoax in order to show how easy it was to deceive the public in this respect.

Letters, Notes, and Answers.

All communications in regard to editorial business should be addressed to ***The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.***

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the British Medical Journal alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the British Medical Journal must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the Journal, should be addressed to the Financial Secretary and Business Manager.

The ***TELEPHONE NUMBERS*** of the British Medical Association and the British Medical Journal are *MUSEUM 9861, 9862, 9863,* and *9864* (internal exchange, four lines).

The ***TELEGRAPHIC ADDRESSES*** are:

EDITOR of the British Medical Journal, *Aitiology Westcent, London.*

FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westcent, London.*

MEDICAL SECRETARY. *Mediocra Westcent, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737 Dublin), and of the Scottish Office, 6, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh).

QUERIES AND ANSWERS.

Motor Car Accidents.

Mr. H. W. Burleigh, secretary and general superintendent of the Hospital for Epilepsy and Paralysis (Maida Vale, London, W.9), asks secretaries of hospitals throughout the country to send him before the end of October statistics as to the number of motor car accidents treated, with, if obtainable, the average length of stay of the patients.

Ionization for Cataract.

E.H.M.—With each development of electrical treatment vigorous measures have been taken to ascertain what, if any, effect these means of treatment have upon eye diseases. *X* rays and high frequency have been tried, and now ionization, which might seem more likely to give beneficial effects, for it is a means of transference of drugs from the superfices into the deeper tissues. The use of ionization has been noticed in the Journal, but its effect is doubtful; it is certainly ineffective when cataract formation has advanced to such a degree that there are actual opacities within the lens. These the treatment cannot affect, for they are definite structural alterations. In the early stages of lens disturbance, when bubbles are visible on high magnification, it has been thought that ionization has been beneficial in some cases. But the benefits have been no more than have been secured by simpler means of subconjunctival injections with fluids that promote vigorous local tissue interchange.

Pain in Disseminated Sclerosis.

"G. P." has had a patient with disseminated sclerosis under treatment for some six years. Organic arsenic and courses of typhoid and T.A.B. vaccines (intravenously) seem to have much slowed the progress of the disease. During the present year an unusual and most troublesome symptom has developed. Not long after the right lower extremity has been straightened, as in bed, intense "sciatica" pain comes on, especially over the outer aspect of thigh. This is at once relieved by sitting on the side of the bed—that is, apparently by relaxation of the spastic hamstrings. Aspirin, aspirin and phenacetin, allonal, dial, veramon, spasmalgin, pyramidon, spasticine, and many other drugs have been tried without success. Our correspondent asks for suggestions.

Dogs under Chloroform.

"Osborne" writes: I have been informed by a veterinary practitioner that dogs showing failing respiration under chloroform are revived by discontinuing the chloroform and the immediate application on the back of the tongue of two to three drops of Scheele's solution of prussic acid. Is there any parallel to this in the human being?

Poisoning and Hanging.

Dr. L. A. Parry (Hove) asks for information on any of the following points: (1) Date of earliest recorded trial for poisoning in this country. (2) Date of earliest poisoning trial in which medical evidence was given. (3) Date of same in which any analysis of viscera was made. (4) Any other interesting points bearing on above. (5) Date of substitution of drop method of execution in place of strangulation. (6) Is present method of execution by subaural or submental knot?

Income Tax.

Practice Sold.

"Ex-Medicus" sold his practice in May last and has now received an assessment notice on the basis of the amount of his earnings for the year 1926. Is he liable on that amount?

*** No. The assessment is in respect of the profits of the practice *for* the year to April 5th, 1928, and should be divided between "Ex-Medicus" and his successor on a time basis. Thus, suppose he sold his practice to A as from May 17th, 1927, then he is liable on six fifty-seconds of £288—say, £33—before deduction of allowances, and the balance of £255 relates to the period May 17th, 1927, to April 5th, 1928, and is applicable to his successor for the period to April 5th, 1928. We advise our correspondent to write to the inspector of taxes stating the date of sale of the practice and the name of the purchaser, and asking for his notice of assessment to be amended and returned to him. The inspector will presumably take the matter up with the successor, and "Ex-Medicus" will ultimately have a claim to repayment for 1927–28 in respect of the tax deducted from his dividends, etc.

Car and Locumtenent Expenses.

"J. D. H." is in partnership and, owing to ill-health, has to provide a locumtenent, and will have to sell his share in the firm. In April of this year he incurred the expense of replacing his car. What relief can he obtain for these expenses?

*** The amount of the firm's assessment for 1927–28 is fixed by the profit for 1926–27, and therefore the expenses referred to will not affect the total tax payable by the firm for 1927–28. It is, of course, obvious, however, that they will operate to reduce the assessment for 1928–29, when, in all probability, "J. D. H." will no longer be a partner. It seems to us a matter for adjustment between "J. D. H." and his partner. The gross assessment should be divided between them in accordance with the terms of the partnership arrangement *for that year*. If for 1927–28 "J. D. H." incurs a special expense which will operate in favour of the firm in future years, there is much to be said for treating at least a part of such expenditure specially—that is, as chargeable to his share of the partnership assessment. Admittedly this will mean that his partner will pay tax for 1927–28 on a greater amount than he receives, but, on the other hand, for 1928–29 the position will be that he will benefit by the deduction

of expenses which are not then being incurred, so that, taking the two years together, he should not suffer any hardship on the basis suggested.

Car Replacement.

"M. H." bought a second-hand car for £90 in March, 1925, and sold it in June, 1926, for £70, buying a new car for £200. What should he claim?

*** Any claim he now has is for the year 1927–28, and for that and subsequent years he cannot, in our opinion, claim "depreciation" on the old car. That car became obsolete—so far as "M. H." is concerned—in 1925; he can claim to include as part of his professional expenses for 1926 the sum of £90–£70=£20 as an obsolescence allowance due under Rule 7, Schedule D, Cases I and II. Also he is entitled to claim the usual percentage depreciation allowance on the £200 (15 per cent. or 20 per cent.) for 1927–28.

Production of Accounts.

"T. A. F. T." employed an accountant to prepare his figures last year; this year he made his return himself to save the expense, but the inspector of taxes asked for a certified copy of his accounts after his return was made. Since then a formal notice of assessment has been received which agrees with the return already made. Should he employ an accountant in such circumstances?

*** Presumably the accountant looked into the question of expenses carefully last year, and our correspondent, in preparing his figures for the return this year, has followed similar lines to those then laid down. If so it is unlikely that other allowable expenses would now be discovered, and our advice would be that "T. A. F. T." should himself make a copy of the detailed statement of receipts and classified expenses, which we assume he prepared for the purpose of his return, certify it to be correct, and forward it to the inspector, explaining that he does not consider that the facts warrant the payment of a professional accountant's fees.

LETTERS, NOTES, ETC.

INSURANCE AGAINST ACCIDENTS TO DEPUTIES.

MR. L. FERRIS-SCOTT, F.C.A., Financial Secretary and Business Manager, writes: On page 712 of the JOURNAL of October 15th "Sheffield" writes on the question of insurance against accidents to deputies, and says, "I intend in future to cut all this trouble out by only engaging a locumtenent who has insured himself against all risks." I am afraid that "Sheffield" is labouring under a misapprehension, or, alternatively, that there is some means of transferring the liability which is unknown to me. I am under the impression that an employer cannot contract out of his responsibilities under the Workmen's Compensation Acts (except in accordance with special provisions laid down in the Act of which mention is made below), and, further, that the maximum benefit under the Acts for fatal injury (where the workman leaves dependants) is £600 and not £300. Subject to possible correction I would set out the position as follows:

(*a*) He can run the risk himself and in respect of his own estate (which, I believe, would be foolish). (*b*) He can, by paying a premium, transfer his liability to an insurance company of repute, which will pay on his behalf such amounts as become due and payable under the Workmen's Compensation Acts. (*c*) A mutual agreement may be entered into between an employer and his workmen for the substitution of a special scheme of compensation, benefit, or insurance for the workmen, in lieu of the compensation provided by the Workmen's Compensation Acts. All such schemes to be effective must be certified by the Registrar of Friendly Societies, and no such certificate will be given unless the benefits provided by the scheme are as favourable to the workmen and their dependants as the corresponding benefits of the Workmen's Compensation Act, and unless a majority of the workmen to whom the scheme is applicable are in favour of such scheme. Should the scheme provide for contributions from the workmen, the benefits conferred must be at least equal to those contributions in addition to the benefit to which the workmen would have been entitled under the Acts. The scheme must contain no obligation upon the workmen to join as a condition of their employment, and must permit of voluntary withdrawal. No insurance effected by a workman would relieve an employer of his liability under the Acts.

I cannot too strongly urge every member of the Association to insure against his liability, not only for locumtenents, but in respect of assistants, dispensers, nurses, etc., and for domestic servants who come under the provisions of the Workmen's Compensation Acts; it would be to the benefit of the medical profession that they should take out policies approved by the Medical Insurance Agency.

TREATMENT OF VARICOSE VEINS BY INJECTION.

A FATAL issue to the treatment of a case of varicose veins by injections is reported by Dr. O. A. Olson in the *Journal of the American Medical Association* for August 27th. A woman, aged 33, had been wearing elastic stockings for varicose veins in both legs with complete relief, when she received injections on two days with salt solution and calorose. Five days after the second injection she died suddenly, and at the necropsy a thrombotic mass was discovered in the right ventricle. Large thrombi were present in a varicose vein in the right leg; a thrombus was found in the right interval salphenous vein, with a broken-off end; there was phlebitis of this vein also. The spleen, liver, pancreas, kidneys, brain, and other organs appeared normal; the cardiac muscle and valves were healthy. This incident adds point to the concluding sentence of our recent discussion of this procedure (JOURNAL, September 24th, p. 558), when reference was made to the possibility of awkward complications ensuing.

MENSTRUAL "UNCLEANLINESS."

DR. G. LOWELL WEBB (Bexhill-on-Sea) writes: If Dr. Robert Hutchison will refer to "Taboo and the Perils of the Soul" and "Balder the Beautiful" (vol. i of Sir James Frazer's *Golden Bough*) he will find numerous references to the origin of this idea. The crude philosophy of primitive man imposed certain taboos on the priest-king-god upon whose health and vitality the prosperity of the country depended, and menstrual uncleanliness was one of these, which also extended to the king's worshippers. Moses merely formulated a taboo which had been in existence for many thousands of years previously, as had others before him. It extended to the pollution of rivers, wells, and seas, herds and crops, as well as to many articles of food, but in certain localities the supposed effects of menstrual blood were utilized in a reverse way for destroying the pests which attacked the crops, by making women at this period walk amongst them. Pliny reasserts the same ideas, even to the dimming of mirrors and the rusting of razors. Three of Sir James Frazer's correspondents informed him that it was quite a common belief in recent years in many parts of England that a menstruating woman should not be allowed to assist at the pickling of beef or pork, for fear of decomposition.

DR. W. M. FELDMAN (London, W.) writes: In reply to Dr. Robert Hutchison's inquiry, information on the subject will be found in my book (just out) on *The Principles of Ante-natal and Post-natal Child Hygiene* (John Bale, Sons and Danielsson, Ltd.). On p. 685 occurs the following paragraph:

> "The Biblical injunction regarding the semi-isolation of a menstruating woman has recently been explained on a scientific basis. It has been found that during her menstrual period her blood, saliva, perspiration, and milk contain a toxic material which is harmful to living tissue, especially plants, so that a flower held by a menstruating woman will wilt more quickly than one held by her at any other time. The toxin in the milk may also explain the occasional disturbance of the nursling during the mother's menstrual period."

The experimental investigation of the subject was carried out by David I. Macht and Dorothy S. Lobin of the Pharmacological Laboratory of the Johns Hopkins University, and fully recorded in a paper entitled "A phyto-pharmacological study of menstrual toxin" in the *Journal of Pharmacology and Experimental Therapy*, 1924, xxii, pp. 413–66. The results were so constant that the authors could without much difficulty diagnose or differentiate between menstrual and normal saliva (or other body fluid) when unknown specimens were submitted to them. The toxin, which has been named "menotoxin," is found to have some chemical relationship to oxy-cholesterin.

TREATMENT OF FACIAL PARALYSIS DUE TO EXPOSURE.

DR. VERA VEITCH (Hartshill Orthopaedic Hospital, Stoke-on-Trent) writes with reference to Mr. Bertwistle's description of his splint in the treatment of facial palsy (JOURNAL, September 17th, p. 496). She agrees that relaxation of the paretic or paralysed muscles is the accepted principle of treatment, and that, with the addition of mild graduated faradism in the early stages, and re-education of the muscles when they begin to recover function, is probably all that is necessary in the treatment of such cases. She continues: We have had a considerable number of these cases referred to us at the Cripples' Hospital, Stoke-on-Trent, during the past few years, and our difficulty has been the devising of a mouth brace which the patient can wear constantly, so that the paretic muscles shall never be stretched. We have eventually produced a splint on the same principle as that of Mr. Bertwistle, which we find the patient can wear with comfort. This brace consists of silver-plated wire of sufficient strength to maintain the facial muscles in the position of selection. The face and ear portion is covered with chamois leather, and the mouth portion is covered with the rubber tip of a No. 6 Jacques's catheter, so that it can be frequently washed. Originally we used ordinary metal wire, but several patients complained of a nasty taste in their mouth. Silver suture wire was then tried, which did away with the unpleasant taste, but the cost of this (7s. 6d. an ounce) was against its everyday use. The silver-plated wire is entirely satisfactory and only costs 7d. an ounce. For hospital use ordinary rubber tubing is used, with the open end stitched down. Where a more neatly finished splint is required, then the catheter is employed.

PREGNANCY AND GLYCOSURIA.

DR. ZELICK GREEN (London) writes: I was asked to examine a married woman for an insurance company about May. She was then seven months pregnant (primipara), and had sugar in the urine; otherwise she was in good health. To-day—six weeks after her confinement—I again examined her urine and found no sugar. I might add that she gave birth to a girl, which may interest Dr. D. M. Macdonald (BRITISH MEDICAL JOURNAL, October 1st, p. 620).

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 46, 47, 50, and 51 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 48 and 49.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *163*.